

126-TRC-14-006

SAFETY COMPLIANCE TESTING FOR FMVSS 126
Electronic Stability Control Systems

Mazda Motor Corporation
2014 Mazda 3
NHTSA No. C20145406

TRANSPORTATION RESEARCH CENTER INC.
10820 State Route 347
East Liberty, Ohio 43319



August 29, 2014

FINAL REPORT

Prepared Under Contract No.: DTNH22-11-D-00247

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National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
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16. Abstract A test was conducted on a 2014 Mazda 3, NHTSA No. C20145406, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-126-03 for the determination of FMVSS 126 compliance. Test failures identified were as follows: None		
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1.0 PURPOSE OF COMPLIANCE TEST

The purpose of this test is to determine if the test vehicle, a MY 2014 Mazda 3 meets the minimum equipment and performance requirements stated in Federal Motor Vehicle Safety Standard (FMVSS) 126, "Electronic Stability Control Systems."

This standard establishes performance and equipment requirements for Electronic Stability Control (ESC) Systems installed in passenger cars, multipurpose passenger vehicles, trucks, and buses with a gross vehicle weight rating of 4,536 kilograms or less.

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS

Testing of the MY 2014 Mazda 3 was conducted at Transportation Research Center Inc. (TRC Inc.) in accordance with NHTSA TP-126-03, dated September 9, 2011.

The vehicle was inspected to ensure it was equipped with an ESC System that:

- Augments vehicle directional stability by applying and adjusting brake torques individually at each wheel to induce a correcting yaw moment to a vehicle;
- Is computer controlled with the computer using a closed-loop algorithm to limit vehicle oversteer and to limit vehicle understeer;
- Has a means to determine the vehicle's yaw rate and to estimate its side slip or side slip derivative with respect to time;
- Has a means to monitor driver steering inputs;
- Has an algorithm to determine the need, and a means to modify engine torque, as necessary, to assist the driver in maintaining control of the vehicle, and
- Is operational over the full speed range of the vehicle (except at vehicle speeds less than 20km/h (12.4mph), when being driven in reverse, or during system initialization).

The vehicle was subjected to a 0.7Hz Sine with Dwell (SWD) Steering Maneuver to ensure that it would meet the stability and responsiveness requirements of the standard as follows:

- At 1.0 second after completion of a required sine with dwell steering input, the yaw rate of the vehicle must not exceed 35 percent of the first peak value of yaw rate recorded after the steering wheel angle changes sign (between first and second peaks during the same test run).
- At 1.75 seconds after completion of a required sine with dwell steering input, the yaw rate of the vehicle must not exceed 20 percent of the first peak value of yaw rate recorded after the steering wheel angle changes sign (between first and second peaks during the same test run).
- The lateral displacement of the vehicle center of gravity with respect to its initial

straight path must be at least 1.83 m (6 feet) (for vehicles with a GVWR of 3,500kg (7,716 lb) or less) when computed 1.07 seconds after the Beginning of Steer (BOS) at the specified steering wheel angles.

System malfunction simulations were executed to verify vehicle could identify and indicate a malfunction.

System related malfunction and Off telltales, and related controls were inspected for required identification and labeling.

The vehicle's ESC System appears to meet the performance and equipment requirements as required by FMVSS 126. The test results are summarized on the following summary sheet.

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS ...continued

DATA SUMMARY (Sheet 1 of 2)

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / 3 / Passenger Car

VEHICLE NHTSA NO.: C20145406 VIN: JM1BM1V74E1215505

VEHICLE TYPE: Passenger Car DATE OF MANUFACTURE: 06/14

LABORATORY: Transportation Research Center Inc.

REQUIREMENTS	PASS/FAIL
--------------	-----------

ESC Equipment and Operational Characteristics (Data Sheet 2)

The vehicle is to be equipped with an ESC System that meets the equipment PASS and operational characteristics requirements. (S126, S5.1, S5.6)

ESC Malfunction Telltale – Location, Labeling and Bulb Check (Data Sheet 3)

Telltale meets the requirements for mounting, symbol or text, color and check of lamp function (S126, S5.3.1, S5.3.2, S5.3.4, S5.3.5, S5.3.6 and S5.3.8) PASS

“ESC Off” and other System Controls and Telltale (Data Sheet 3 & 4)

If provided, telltale meets the requirements for mounting, symbol, or text, color and check of lamp function (S126, S5.5.1, S5.5.2, S5.5.3, S5.5.6, S5.5.7, S5.5.8) PASS

If provided, off control meets the label requirements (S126, S5.4.3) PASS

If provided, off control and other system controls as well as the ESC off telltale meets the operational requirements (S126, S5.4, S5.4.1, S5.4.4, S5.5.4, and S5.5.9) PASS

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS ...continued

DATA SUMMARY (Sheet 2 of 2)

REQUIREMENTS	PASS/FAIL
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Vehicle Lateral Stability (Data Sheet 8)

Yaw Rate Ratio at 1 second after COS is less than 35% of peak value. PASS
(S126, S5.2.1)

Yaw Rate Ratio at 1.75 seconds after COS is less than 20% of peak value. PASS
(S126, S5.2.2)

Vehicle Responsiveness (Data Sheet 8)

Lateral displacement at 1.07 seconds after BOS is at least 1.83 m (6 feet) for vehicles with a GVWR of 3,500 kg (7,716 lbs.) or less, and 1.52 m (5 feet) for vehicles with a GVWR greater than 3,500 kg (7,716 lbs.). (S126 S5.2.3) PASS

ESC Malfunction Warning (Data Sheet 9)

Warning is provided to driver after malfunction occurrence. PASS
(S126. S5.3)

Malfunction telltale stayed illuminated as long as malfunction existed and must extinguish after malfunction was corrected. PASS
(S126, S5.3.3 and S5.3.7)

REMARKS

3.0 TEST DATA

DATA SHEET 1 (Sheet 1 of 2)
TEST VEHICLE INSPECTION AND TEST PREPARATION

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / 3 / Passenger Car

NHTSA No.: C20145406 TEST DATE: 8-25-14

VIN: JM1BM1V74E1215505 MANUFACTURE DATE: 06/14

GVWR: 1,815 KG FRONT GAWR: 975 KG REAR GAWR 848 KG

SEATING POSITIONS: FRONT 2 MID 0 REAR 3

ODOMETER READING AT START OF TEST: 4 (6) Miles (Kilometers)

DESIGNATED TIRE SIZE(S) FROM VEHICLE LABELING:

Front Axle P205/60R16 Rear Axle P205/60R16

INSTALLED TIRE SIZE(S) ON VEHICLE:

Manufacturer and Model Yokohama Avid S34 Yokohama Avid S34

Tire Size Designation P205/60R16 91H P205/60R16 91H

TIN Left Front DOT FD20 PHY2314 Right Front DOT FD20 PHY2314

Left Rear DOT FD20 PHY2314 Right Rear DOT FD20 PHY2314

Are installed tire sizes same as labeled tire sizes? Yes No
If no, contact COTR for further guidance.

DRIVE CONFIGURATIONS (MARK ALL THAT APPLY):

Two Wheel Drive (2WD): () Front Wheel Drive () Rear Wheel Drive
 All Wheel Drive (AWD)
 Four Wheel Drive Automatic – differential not locked full time (4WD Automatic)
 Four Wheel Drive High Gear Locked Center Differential (4WD HGLD)
 Four Wheel Drive Low Gear (4WD Low)
 Other (define _____)

3.0 TEST DATA....continued

DATA SHEET 1 (Sheet 2 of 2) TEST VEHICLE INSPECTION AND TEST PREPARATION

DRIVE CONFIGURATIONS AND MODES: (ex. default, performance, off)
(For each of the vehicle's drive configurations identify available operating modes)

Drive Configuration 2WD
Mode(s) default

Drive Configuration _____
Mode(s) _____

Drive Configuration _____
Mode(s) _____

VEHICLE STABILITY SYSTEMS (Check applicable technologies):

ESC Traction Control Roll Stability Control
 Active Suspension Electronic Throttle Control Active Steering
 ABS

List other systems: _____

REMARKS:

RECORDED BY: Alan Ida
APPROVED BY: John Phillips

DATE: 8-25-14
DATE: 8-29-14

3.0 TEST DATA...continued

DATA SHEET 2 (Sheet 1 of 2)
ESC SYSTEM HARDWARE AND OPERATIONAL CHARACTERISTICS

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / 3 / Passenger Car

NHTSA No.: C20145406 TEST DATE: 8-28-14

ESC SYSTEM IDENTIFICATION:

Manufacturer / Model Continental Automotive Corporation / MK100

ESC SYSTEM HARDWARE (Check applicable hardware):

<input checked="" type="checkbox"/>	Electronic Control Unit	<input checked="" type="checkbox"/>	Hydraulic Control Unit
<input checked="" type="checkbox"/>	Wheel Speed Sensors	<input checked="" type="checkbox"/>	Steering Angle Sensor
<input checked="" type="checkbox"/>	Yaw Rate Sensor	<input checked="" type="checkbox"/>	Lateral Acceleration Sensor

List other components; _____

ESC SYSTEM OPERATIONAL CHARACTERISTICS:

System is capable of generating brake torques at each wheel Yes (PASS)
 No (FAIL)

Brief explanation with reference to components used:

The hydraulic control unit is able to control the brake torque for each wheel by adjusting the hydraulic pressure. To create the brake torque, ESC system controls the valve and pump to increase / decrease each wheel pressure.

System is capable of determining yaw rate Yes (PASS)
 No (FAIL)

Brief explanation with reference to components used:
The actual yaw rate signal is supplied by the yaw rate sensor, which resides in the Restraint Control Module (RCM).

System is capable of monitoring driver steering input Yes (PASS)
 No (FAIL)

Brief explanation with reference to components used:
The driver steering input is calculated based on the relative steering wheel angle signal.

3.0 TEST DATA....continued

DATA SHEET 2 (Sheet 2 of 2) ESC SYSTEM HARDWARE AND OPERATIONAL CHARACTERISTICS

ESC SYSTEM OPERATIONAL CHARACTERISTICS (continued):

System is capable of estimating side slip or side slip derivative Yes (PASS)
 No (FAIL)

Brief explanation with reference to data collected and method used:

The side slip angle is estimated by the hydraulic control unit, which calculates the vehicle behavior based on the wheel speed inputs, the steering wheel angle inputs, the yaw rate signal inputs, and the lateral acceleration input. The side slip derivative is calculated by the hydraulic control unit. The wheel speed signal is supplied by active wheel speed sensor. The actual lateral G signal is supplied by the lateral G sensor which resides in the RCM.

System is capable of modifying engine torque during ESC activation.

Yes (PASS)
 No (FAIL)

Brief explanation of method used to modify engine torque:

The engine control will be activated during under-steering conditions. The engine torque is modified by controlling the throttle by the electronic throttle control and by reducing the spark and cutting the fuel.

System is capable of activation at speeds of 20 km/h (12.4 mph) Yes (PASS)
and higher. No (FAIL)

Speed system becomes active. The ESC system is active at forward vehicle speeds from 14.4 km/h (8.9 mph).

System is capable of activation during the following driving phases (acceleration, deceleration, coasting, and during activation of ABS or traction control). Yes (PASS)
 No (FAIL)

Vehicle manufacturer submitted documentation explaining how the Yes (PASS)
ESC system mitigates understeer? No (FAIL)

DATA INDICATES COMPLIANCE

PASS/FAIL PASS

RECORDED BY: Alan Ida
APPROVED BY: John Phillips

DATE: 8-28-14
DATE: 8-29-14

3.0 TEST DATA....continued

DATA SHEET 3 (Sheet 1 of 4) ESC MALFUNCTION AND OFF TELLTALES Location, Labeling and Bulb Check

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / 3 / Passenger Car

VEHICLE NHTSA NO. C20145406 TEST DATE: 8-28-14

ESC Malfunction Telltale

Vehicle is equipped with malfunction telltale? Yes (Pass) No (Fail)

Telltale Location Instrument cluster, right side, below the fuel gauge

Telltale is mounted inside the occupant compartment in front of and in clear view of the driver?

Yes (Pass) No (Fail) If no, explain _____

Malfunction Telltale symbol or abbreviation required by FMVSS No. 101.



Or

ESC

Vehicle uses this symbol
 Vehicle uses this abbreviation
 Other (Fail)

Note any words or additional symbols used.

Is ESC malfunction telltale part of a common space? Yes No

Is ESC malfunction telltale also used to indicate activation of the ESC system?

Yes No

If yes, explain telltale operation during ESC activation: During ESC activation, the ESC telltale flashes.

3.0 DATA SHEETS....continued

DATA SHEET 3 (Sheet 2 of 4) ESC MALFUNCTION AND OFF TELLTALES Location, Labeling and Bulb Check

“ESC OFF” Telltale (if provided)

Vehicle is equipped with “ESC Off” telltale? Yes No

Is “ESC OFF” telltale combined with “ESC Malfunction” telltale utilizing a two part telltale?

Yes No

Telltale Location Instrument cluster, right side, below the fuel gauge

Telltale is mounted inside the occupant compartment in front of and in clear view of the driver?

Yes (Pass) No (Fail) If no, explain _____

“ESC OFF” Telltale symbol or abbreviation required by FMVSS No. 101.



Or

ESC OFF

Vehicle uses this symbol
 Vehicle uses this abbreviation
 Other (Fail)

Note any words or additional symbols used.

Is ESC Off telltale part of a common space? Yes No

3.0 DATA SHEETS....continued

DATA SHEET 3 (Sheet 3 of 4) ESC MALFUNCTION AND OFF TELLTALES Location, Labeling and Bulb Check

Malfunction Telltale Lamp Function, OR Two-Part Malfunction/Off Telltale Lamp Function:

Identify position of starting system when telltale illuminates.

<input type="checkbox"/> OFF/LOCK	<input type="checkbox"/> Between OFF/LOCK and ON/RUN
<input checked="" type="checkbox"/> ON/RUN	<input type="checkbox"/> Between ON/RUN and Start

Is telltale yellow in color? X Yes No (fail)

Time telltale remains illuminated 3.4 seconds

Note: If telltale is part of common space, it is not required to illuminate during this check of lamp function.

Starter Interlock:

Does vehicle have any starter, transmission or other interlocks that affect operation of the telltale lamp check functions? Yes X No

If yes, describe the interlock feature:

“ESC OFF” Telltale Lamp Function (If separate from Malfunction Telltale):

Identify position of starting system when “ESC OFF” telltale illuminates.

<input type="checkbox"/> OFF/LOCK	<input type="checkbox"/> Between OFF/LOCK and ON/RUN
<input checked="" type="checkbox"/> ON/RUN	<input type="checkbox"/> Between ON/RUN and Start

Is telltale yellow in color? X Yes No (fail)

Time telltale remains illuminated 3.4 seconds

Note: If telltale is part of common space, it is not required to illuminate during the check of lamp function.

3.0 DATA SHEETS....continued

DATA SHEET 3 (Sheet 4 of 4) ESC MALFUNCTION AND OFF TELLTALES Location, Labeling and Bulb Check

Starter Interlock:

Does vehicle have any starter, transmission or other interlocks that affect operation of the "ESC OFF" telltale lamp check functions? _____ Yes No

If yes, describe the interlock feature:

DATA INDICATES COMPLIANCE

PASS/FAIL PASS

REMARKS:

RECORDED BY: Alan Ida
APPROVED BY: John Phillips

DATE: 8-28-14
DATE: 8-29-14

3.0 TEST DATA...continued

DATA SHEET 4 (Sheet 1 of 4)
ESC AND ANCILLARY SYSTEM CONTROLS

“ESC OFF” Controls Identification and Operational Check:

Is the vehicle equipped with a control or controls whose purpose is to deactivate the ESC system or place the ESC system in a mode or modes that may no longer satisfy the performance requirements of the standard?

Yes No

Type of control or controls provided?
(mark all that apply)

Dedicated "ESC Off" control
 Multi-functional control with an "ESC Off" mode
 Other (describe) _____

Identify each control location, labeling and selectable modes.

First Control: Location Instrument panel, left of steering column
(If applicable) Labeling Skidding car symbol with "Off" underneath
Modes ESC Off (momentary press)
ESC On (momentary press)

“ESC OFF” Control identification symbol or abbreviation required by FMVSS No. 101.



Or

ESC OFF

Vehicle uses this symbol
 Vehicle uses this abbreviation

Note any words or additional symbols used.

3.0 TEST DATA....continued

DATA SHEET 4 (Sheet 2 of 4) ESC AND ANCILLARY SYSTEM CONTROLS

Second Control: Location _____ N/A
(If applicable) Labeling _____
Modes _____

“ESC OFF” Control identification symbol or abbreviation required by FMVSS No. 101.



Or

ESC OFF

_____ Vehicle uses this symbol
_____ Vehicle uses this abbreviation

Note any words or additional symbols used.

Identify standard or default drive configuration _____ Default - 2WD

Verify standard or default drive configuration selected. Yes No

Does the “ESC Off” telltale illuminate upon activation of the ESC off control or selection of the “ESC Off” mode on the multi-function control?

_____ NA Yes No (fail)

Does the “ESC Off” telltale extinguish when the starting system is cycled from “On” (“Run”) to “Lock” or “Off” and then back again to the “On” (“Run”) position?

_____ NA Yes No (fail)

If no, describe how the off control functions:

3.0 TEST DATA....continued

DATA SHEET 4 (Sheet 3 of 4) ESC AND ANCILLARY SYSTEM CONTROLS

If a multi-function control is provided, cycle through each mode setting on the control and record which modes illuminate the "ESC Off" telltale. Also, for those modes that illuminate the "ESC Off" telltale identify if the telltale extinguishes upon cycling the ignition system.

Control Modes	"ESC Off" telltale illuminates upon activation of control? (Yes/No)	"ESC Off" telltale extinguishes upon cycling ignition? (Yes/No)
N/A		

For each mode that illuminates the "ESC Off" telltale, did the telltale extinguish when the ignition was cycled from "On" ("Run") to "Lock" or "Off" and then back again to the "On" ("Run") position?

X NA Yes No (fail)

Other System Controls that have an ancillary effect on ESC Operation:

Is the vehicle equipped with any ancillary controls that upon activation may deactivate the ESC System or place the ESC System in a mode or modes that may no longer satisfy the performance requirements of the standard?

Yes X No

List and describe each control (i.e. alternate drive configuration selection controls):

Ancillary Control: System _____ N/A
Control Description _____
Labeling _____

Ancillary Control: System _____ N/A
Control Description _____
Labeling _____

3.0 TEST DATA....continued

DATA SHEET 4 (Sheet 4 of 4) ESC AND ANCILLARY SYSTEM CONTROLS

Activate each control listed above and record whether the control illuminates the “ESC Off” telltale. Also, record warnings or messages provided regarding the ESC System.

Ancillary Control	Control Activates “ESC Off” Telltale? (Yes/No)	Warnings or Messages Provided
N/A		

For those controls that illuminate the “ESC Off” telltale above identify if the “ESC Off” telltale extinguishes upon cycling the ignition system.

Ancillary Control	“ESC Off” telltale extinguishes upon cycling ignition? (Yes/No)
N/A	

For each control that illuminates the “ESC Off” telltale, did the telltale extinguish when the ignition is cycled from “On” (“Run”) to “Lock” or “Off” and then back again to the “On” (“Run”) position? If the control activated places the vehicle into a low-range four-wheel drive configuration designed for low-speed, off-road driving, the ESC System may remain turned off after the ignition has been cycled off and then back on and therefore the “ESC Off” telltale may not extinguish.

NA Yes No (fail)

DATA INDICATES COMPLIANCE:

PASS/FAIL PASS

REMARKS:

RECORDED BY: Alan Ida
APPROVED BY: John Phillips

DATE: 8-28-14
DATE: 8-29-14

3.0 TEST DATA....continued

DATA SHEET 5 (Sheet 1 of 3) VEHICLE AND TEST TRACK DATA

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / 3 / Passenger Car

NHTSA No.: C20145406 TEST DATE: 8-26-14

Test Track Requirements: Test Surface Slope (0-1 %) 1 %

Peak Friction Coefficient (at least 0.9) 0.97

Test Track Data Meets Requirements: Yes/No Yes

If no, explain: _____

Full Fluid Levels: Fuel X Coolant X Other Fluids Washer (specify)

Tire Pressures: Required: Front Axle 250 kPa Rear Axle 250 kPa

Actual: LF 250 kPa RF 250 kPa
LR 250 kPa RR 250 kPa

Vehicle Dimensions: Track Width 155.7 cm Wheelbase 269.9 cm

Vehicle weight ratings: GAWR Front 975 KG GAWR Rear 848 KG

Unloaded Vehicle Weight (UVW)

Front Axle 799.8 KG Left Front 400.2 KG Right Front 399.6 KG

Rear Axle 526.6 KG Left Rear 275.6 KG Right Rear 251.0 KG

Total UVW 1,326.4 KG

Baseline Weight and Outrigger Selection (only for MPVs, Trucks, Buses)

Calculated Baseline Weight (UVW+ 73 kg) 1,399.4 KG

Outrigger size required ("Light," "Standard" or "Heavy") N/A

Light – Baseline weight under 1,588 kg (3,500 lbs.)

Standard - Baseline weight equal to or greater than 1,588 kg (3,500 lbs.)
and under 2,722 kg (6,000 lbs.)

Heavy - Baseline weight equal to or greater than 2,722 kg (6,000 lbs.)

3.0 TEST DATA....continued

DATA SHEET 5 (Sheet 2 of 3) VEHICLE AND TEST TRACK DATA

Loaded Vehicle Weight w/ Driver and Instrumentation (No Ballast)

Front Axle 878.4 KG Left Front 445.2 KG Right Front 433.2 KG

Rear Axle 592.6 KG Left Rear 316.0 KG Right Rear 276.6 KG

Vehicle Weight 1,471.0 KG

Ballast Required = **[Total UVW + 168 KG] - Loaded Weight w/ Driver and Instrumentation**

$$= [\underline{1,326.4} \text{ KG} + 168 \text{ KG}] - \underline{1,471.0} \text{ KG}$$

$$= \underline{23.4} \text{ KG}$$

Total Loaded Vehicle Weight w/Driver, Instrumentation and Ballast

Front Axle 889.0 KG Left Front 447.4 KG Right Front 441.6 KG

Rear Axle 605.4 KG Left Rear 319.6 KG Right Rear 285.8 KG

Total Loaded Vehicle Weight 1,494.4 KG

3.0 TEST DATA....continued

DATA SHEET 5 (Sheet 3 of 3) VEHICLE AND TEST TRACK DATA

Center of Gravity and Inertial Sensing System Location at Loaded Vehicle Condition

x-distance (longitudinal) Point of reference is the front axle centerline.
(Positive from front axle toward rear of vehicle.)

y-distance (lateral) Point of reference is the vehicle centerline.
(Positive from the center toward the right.)

z-distance (vertical) Point of reference is the ground plane.
(Positive from the ground up.)

Locations:

	Center of Gravity	Inertial Sensing System
x-distance	<u>109.3</u> cm	<u>160.0</u> cm
y-distance	<u>-2.1</u> cm	<u>0.5</u> cm
z-distance	<u>54.8</u> cm	<u>80.5</u> cm
Roof Height:	<u>144.2</u> cm	
Distance Between Ultrasonic Sensors:		<u>185.7</u> cm

REMARKS:

RECORDED BY: Alan Ida
APPROVED BY: John Phillips

DATE: 8-26-14
DATE: 8-29-14

3.0 TEST DATA....continued

DATA SHEET 6 (Sheet 1 of 3) BRAKE AND TIRE CONDITIONING

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / 3 / Passenger Car

VEHICLE NHTSA No.: C20145406

Measured Cold Tire Pressures: LF 250 kPa RF 250 kPa
LR 250 kPa RR 250 kPa

Wind Speed 0.9 m/sec
(10m/sec (22mph) max for passenger cars; 5m/s (11mph) max. for MPVs and Trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) 22.8 °C

Brake Conditioning Time; 10:05 AM Date; 8-27-14

56 km/h (35 mph) Brake Stops

Number of stops executed (10 required) 10 stops

Observed deceleration rate range (.5g target) 0.50 – 0.55 g

72 km/h (45 mph) Brake Stops

Number of stops executed (3 required) 3 stops

Number of stops ABS activated (3 required) 3 stops

Observed deceleration rate range 1.2 – 1.3 g

72 km/h (45 mph) Brake Cool Down Period

Duration of cool down period (5 minutes min.) 5:07 minutes

3.0 TEST DATA...continued

DATA SHEET 6 (Sheet 2 of 3) BRAKE AND TIRE CONDITIONING

Tire Conditioning Series No. 1 Time: 10:25 AM Date: 8-27-14

Measured Tire Pressures: LF 273 kPa RF 271 kPa
LR 268 kPa RR 267 kPa

Wind Speed 0.9 m/sec
(10m/sec (22mph) max for passenger cars; 5m/s (11mph) max. for MPVs and Trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) 22.8 °C

30 meter (100 ft) Diameter Circle Maneuver				
Test Runs	Steering Direction	Target Lateral Acceleration (g)	Observed Lateral Acceleration (g)	Observed Vehicle Speed (km/h)
1-3	Clockwise	0.5-0.6	0.55	32.5
4-6	Counterclockwise	0.5-0.6	0.55	32.5

1 Hz 5 Cycle Sinusoidal Steering Maneuver to Determine Steering Wheel Angle For 0.5-0.6g Lateral Acceleration				
Test Runs	Vehicle Speed Km/h(mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1	56+2 (35+1)	30	0.5-0.6	0.30
2	56+2 (35+1)	50	0.5-0.6	0.52
3	56+2 (35+1)		0.5-0.6	
4	56+2 (35+1)		0.5-0.6	

Steering wheel angle that corresponds to a peak 0.5–0.6g lateral acceleration: 50 degrees

1 Hz 10 Cycle Sinusoidal Steering Maneuver				
Test Runs	Vehicle Speed Km/h (mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1 - 3	56+2 (35±1)	50 (cycles 1-10)	0.5-0.6	0.52
4	56+2 (35±1)	50 (cycles 1-9)	0.5-0.6	0.52
		100 (cycle 10)*	N/A	0.80

* The steering wheel angle used for cycle 10 should be twice the angle used for cycles 1-9.

3.0 TEST DATA...continued

DATA SHEET 6 (Sheet 3 of 3) BRAKE AND TIRE CONDITIONING

Tire Conditioning Series No. 2 Time: 12:10 PM Date: 8-27-14

Measured Tire Pressures: LF 271 kPa RF 271 kPa
LR 266 kPa RR 266 kPa

Wind Speed 0.4 m/sec
(10m/sec (22mph) max for passenger cars; 5m/s (11mph) max. for MPVs and Trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) 26.1 °C

30 meter (100 ft) Diameter Circle Maneuver				
Test Runs	Steering Direction	Target Lateral Acceleration (g)	Observed Lateral Acceleration (g)	Observed Vehicle Speed (km/h)
1-3	clockwise	0.5-0.6	0.55	32.5
4-6	counterclockwise	0.5-0.6	0.55	32.5

1 Hz 5 Cycle Sinusoidal Steering Maneuver to Determine Steering Wheel Angle For 0.5-0.6g Lateral Acceleration				
Test Runs	Vehicle Speed Km/h (mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1	56+2 (35+1)	N/A	0.5-0.6	N/A
2	56+2 (35+1)		0.5-0.6	
3	56+2 (35+1)		0.5-0.6	
4	56+2 (35+1)		0.5-0.6	

Steering wheel angle that corresponds to a peak 0.5–0.6g lateral acceleration: 50 degrees

1 Hz 10 Cycle Sinusoidal Steering Maneuver				
Test Runs	Vehicle Speed (mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1 - 3	56+2 (35+1)	50 (cycles 1-10)	0.5-0.6	0.50
4	56+2 (35+1)	50 (cycles 1-9)	0.5-0.6	0.50
		100 (cycle 10)*	N/A	0.77

* The steering wheel angle used for cycle 10 should be twice the angle used for cycles 1-9.

REMARKS:

RECORDED BY: Alan Ida
APPROVED BY: John Phillips

DATE: 8-27-14
DATE: 8-29-14

3.0 TEST DATA....continued

DATA SHEET 7 (1 of 2) SLOWLY INCREASING STEER (SIS) MANEUVER

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / 3 / Passenger Car

VEHICLE NHTSA No.: C20145406 TEST DATE: 8-27-14

Measured Tire Pressures: LF 273 kPa RF 271 kPa
LR 268 kPa RR 267 kPa

Wind Speed 0.4 m/sec
(10m/sec (22mph) max for passenger cars; 5m/s (11mph) max. for MPVs and Trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) 23.9 °C

Selected Drive Configuration: FWD

Selected Mode: ESC On (default)

Preliminary Left Steer Maneuver:

Lateral Acceleration measured at 30 degrees steering wheel angle ($a_{y,30 \text{ degrees}}$)

$$a_{y,30 \text{ degrees}} = \underline{0.39 \text{ g}}$$

Assuming a linear relationship the following ratio should be used to calculate the steering wheel angle at .55g.

$$\frac{30 \text{ degrees}}{a_{y,30 \text{ degrees}}} = \frac{\delta_{SIS}}{0.55 \text{ g}} \quad \delta_{SIS} = \underline{42.3 \text{ degrees}} @ 0.55g$$

$$\delta_{SIS} = \underline{40 \text{ degrees}} \text{ (rounded)}$$

Steering Wheel Angle at Corrected 0.3 g Lateral Acceleration:

Maneuver #	Initial Steer Direction	Time Clock (5 min max between runs)	Steering Wheel Angle to nearest 0.1 degree (degrees)	All Conditions Met?
0013	Left	10:52 am	-27.0	Yes
0014	Left	10:54 am	-27.5	Yes
0015	Left	10:57 am	-27.1	Yes
0016	Right	11:00 am	27.5	Yes
0017	Right	11:02 am	27.8	Yes
0018	Right	11:05 am	27.4	Yes

3.0 TEST DATA....continued

DATA SHEET 7 (2 of 2) SLOWLY INCREASING STEER (SIS) MANEUVER

Average Overall Steering Wheel Angle:

$$\delta_{0.3 \text{ g, overall}} = (|\delta_{0.3 \text{ g, left (1)}}| + |\delta_{0.3 \text{ g, left (2)}}| + |\delta_{0.3 \text{ g, left (3)}}| + \delta_{0.3 \text{ g, right (1)}} + \delta_{0.3 \text{ g, right (2)}} + \delta_{0.3 \text{ g, right (3)}}) / 6$$

$$\delta_{0.3 \text{ g, overall}} = \underline{\quad 27.4 \quad} \text{ degrees}$$

[to nearest 0.1 degree]

REMARKS:

RECORDED BY: Alan Ida
APPROVED BY: John Phillips

DATE: 8-27-14
DATE: 8-29-14

3.0 TEST DATA....continued

DATA SHEET 8 (1 of 3) VEHICLE LATERAL STABILITY AND RESPONSIVENESS

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / 3 / Passenger Car

VEHICLE NHTSA No.: C20145406 TEST DATE: 8-27-14

Tire conditioning completed	<input checked="" type="checkbox"/> Yes	No
ESC system is enabled	<input checked="" type="checkbox"/> Yes	No
On track calibration checks have been completed	<input checked="" type="checkbox"/> Yes	No
On track static data file for each sensor obtained	<input checked="" type="checkbox"/> Yes	No

Selected Drive Configuration: FWD

Selected Mode: ESC On (default)

Overall steering wheel angle ($\delta_{0.3\text{ g, overall}}$) 27.4 degrees

Lateral Stability Test Series No. 1 – Counterclockwise Initial Steer Direction

Maneuver #	Clock Time (1.5 – 5 min between each test run)	Commanded Steering Wheel Angle ¹ (degrees)		Yaw Rates (degrees/sec)			YRR at 1.0 sec after COS [$\leq 35\%$]		YRR at 1.75 sec after COS [$\leq 20\%$]	
		Scalar	Angle	$\dot{\psi}_{Peak}$	$\dot{\psi}_{1.0\text{sec}}$	$\dot{\psi}_{1.75\text{sec}}$	%	Pass/Fail	%	Pass/Fail
0025	12:27 pm	1.5* $\delta_{0.3\text{ g}}$	41	12.99	-0.20	-0.24	-1.50	Pass	-1.86	Pass
0026	12:29 pm	2.0* $\delta_{0.3\text{ g}}$	55	17.49	-0.14	-0.03	-0.81	Pass	-0.19	Pass
0027	12:32 pm	2.5* $\delta_{0.3\text{ g}}$	69	22.22	-0.32	-0.16	-1.43	Pass	-0.74	Pass
0028	12:34 pm	3.0* $\delta_{0.3\text{ g}}$	82	26.19	-0.21	-0.01	-0.82	Pass	-0.02	Pass
0029	12:37 pm	3.5* $\delta_{0.3\text{ g}}$	96	30.24	-0.21	0.04	-0.70	Pass	0.14	Pass
0030	12:39 pm	4.0* $\delta_{0.3\text{ g}}$	110	35.92	-0.07	0.04	-0.19	Pass	0.11	Pass
0031	12:42 pm	4.5* $\delta_{0.3\text{ g}}$	123	39.07	-0.04	0.08	-0.10	Pass	0.20	Pass
0032	12:44 pm	5.0* $\delta_{0.3\text{ g}}$	137	44.48	-0.17	-0.13	-0.39	Pass	-0.30	Pass
0033	12:48 pm	5.5* $\delta_{0.3\text{ g}}$	151	48.89	-0.06	0.04	-0.12	Pass	0.09	Pass
0034	12:51 pm	6.0* $\delta_{0.3\text{ g}}$	164	51.67	0.01	0.10	0.03	Pass	0.20	Pass
0035	12:53 pm	6.5* $\delta_{0.3\text{ g}}$	178	51.01	-0.03	0.00	-0.05	Pass	0.00	Pass
0036	12:56 pm	7.0* $\delta_{0.3\text{ g}}$	192	53.56	0.02	-0.01	0.03	Pass	-0.01	Pass
0037	12:58 pm	7.5* $\delta_{0.3\text{ g}}$	205	55.21	0.05	0.04	0.09	Pass	0.07	Pass
0038	1:00 pm	8.0* $\delta_{0.3\text{ g}}$	219	55.48	0.10	-0.03	0.17	Pass	-0.05	Pass
0039	1:03 pm	8.5* $\delta_{0.3\text{ g}}$	233	58.58	0.05	0.04	0.09	Pass	0.07	Pass
0040	1:05 pm	9.0* $\delta_{0.3\text{ g}}$	247	58.24	0.16	0.17	0.27	Pass	0.29	Pass
0041	1:08 pm	9.5* $\delta_{0.3\text{ g}}$	260	57.82	-0.04	0.11	-0.07	Pass	0.20	Pass
0042	1:11 pm	9.9* $\delta_{0.3\text{ g}}$	270	57.80	0.00	0.01	0.01	Pass	0.02	Pass

1. Maneuver execution should continue until a steering wheel angle magnitude factor of $6.5^* \delta_{0.3\text{ g, overall}}$ or 270 degrees is utilized, whichever is greater provided the calculated magnitude of $6.5^* \delta_{0.3\text{ g, overall}}$ is less than or equal to 300 degrees. If $6.5^* \delta_{0.3\text{ g, overall}}$ is less than 270 degrees maneuver execution should continue by increasing the steering wheel angle magnitude by multiples of $0.5^* \delta_{0.3\text{ g, overall}}$ without exceeding the 270 degree steering wheel angle.

3.0 TEST DATA....continued

DATA SHEET 8 (2 of 3) VEHICLE LATERAL STABILITY AND RESPONSIVENESS

Lateral Stability Test Series No. 2 – Clockwise Initial Steer Direction

Maneuver #	Clock Time (1.5 – 5 min between each test run)	Commanded Steering Wheel Angle ¹ (degrees)		Yaw Rates (degrees/sec)			YRR at 1.0 sec after COS [$\leq 35\%$]		YRR at 1.75 sec after COS [$\leq 20\%$]	
		Scalar	Angle	$\dot{\psi}_{Peak}$	$\dot{\psi}_{1.0sec}$	$\dot{\psi}_{1.75sec}$	%	Pass/Fail	%	Pass/Fail
0043	1:13 pm	1.5* $\delta_{0.3g}$	41	-13.18	0.16	0.11	-1.18	Pass	-0.87	Pass
0044	1:16 pm	2.0* $\delta_{0.3g}$	55	-18.18	0.09	0.05	-0.50	Pass	-0.30	Pass
0045	1:18 pm	2.5* $\delta_{0.3g}$	69	-23.02	0.18	0.06	-0.77	Pass	-0.26	Pass
0046	1:24 pm*	3.0* $\delta_{0.3g}$	82	-25.90	0.07	-0.06	-0.27	Pass	0.25	Pass
0047	1:28 pm	3.5* $\delta_{0.3g}$	96	-32.39	-0.12	-0.15	0.37	Pass	0.47	Pass
0048	1:30 pm	4.0* $\delta_{0.3g}$	110	-37.65	0.35	0.32	-0.92	Pass	-0.84	Pass
0049	1:33 pm	4.5* $\delta_{0.3g}$	123	-42.26	0.26	0.19	-0.62	Pass	-0.45	Pass
0050	1:36 pm	5.0* $\delta_{0.3g}$	137	-45.55	0.34	0.24	-0.74	Pass	-0.53	Pass
0051	1:38 pm	5.5* $\delta_{0.3g}$	151	-49.28	0.20	0.13	-0.40	Pass	-0.26	Pass
0052	1:41 pm	6.0* $\delta_{0.3g}$	164	-52.38	0.18	0.05	-0.35	Pass	-0.10	Pass
0053	1:43 pm	6.5* $\delta_{0.3g}$	178	-55.11	0.08	0.06	-0.15	Pass	-0.11	Pass
0054	1:46 pm	7.0* $\delta_{0.3g}$	192	-57.09	0.14	0.19	-0.24	Pass	-0.34	Pass
0055	1:48 pm	7.5* $\delta_{0.3g}$	205	-58.75	0.19	0.26	-0.33	Pass	-0.44	Pass
0056	1:51 pm	8.0* $\delta_{0.3g}$	219	-61.21	0.18	0.13	-0.29	Pass	-0.22	Pass
0057	1:53 pm	8.5* $\delta_{0.3g}$	233	-61.78	0.13	0.11	-0.22	Pass	-0.18	Pass
0058	1:56 pm	9.0* $\delta_{0.3g}$	247	-63.43	0.07	0.07	-0.11	Pass	-0.11	Pass
0059	1:58 pm	9.5* $\delta_{0.3g}$	260	-62.48	0.11	0.08	-0.17	Pass	-0.13	Pass
0060	2:01 pm	9.9* $\delta_{0.3g}$	270	-62.25	0.02	0.03	-0.03	Pass	-0.05	Pass

1. Maneuver execution should continue until a steering wheel angle magnitude factor of $6.5^* \delta_{0.3g, overall}$ or 270 degrees is utilized, whichever is greater provided the calculated $6.5^* \delta_{0.3g, overall}$ is less than or equal to 300 degrees. If $6.5^* \delta_{0.3g, overall}$ is less than 270 degrees maneuver execution should continue by increasing the steering wheel angle magnitude by multiples of $0.5^* \delta_{0.3g, overall}$ without exceeding the 270 degree steering wheel angle.

During execution of the sine with dwell maneuvers were any of the following events observed?

Rim-to-pavement contact	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
Tire debeading	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
Loss of pavement contact of vehicle tires	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
Did the test driver experience any vehicle loss of control or spinout?	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No

If "Yes" explain the event and consult with the COTR. _____

3.0 TEST DATA...continued

DATA SHEET 8 (3 of 3) VEHICLE LATERAL STABILITY AND RESPONSIVENESS

Responsiveness – Lateral Displacement

1. Lateral displacement should be \geq 1.83 m (6 ft) for vehicles with a GVWR of 3,500 kg (7,716 lb) or less; and \geq 1.52 m (5ft) for vehicles with a GVWR greater than 3,500 kg (7,716 lb).

DATA INDICATES COMPLIANCE:

PASS/FAIL PASS

*The time clock between maneuvers 0045 and 0046 is more than 5 minutes due to the data acquisition system not recording during the first attempt. Therefore, the steering angle scalar was repeated.

RECORDED BY: Alan Ida
APPROVED BY: John Phillips

DATE: 8-27-14
DATE: 8-29-14

3.0 TEST DATA....continued

DATA SHEET 9 (Sheet 1 of 6)
MALFUNCTION WARNING TEST
(Test Number 1)

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / 3 / Passenger Car

VEHICLE NHTSA No.: C20145406 TEST DATE: 8-28-14

METHOD OF MALFUNCTION SIMULATION:

Describe method of malfunction simulation: Disconnect Right Front wheel speed sensor connector.

MALFUNCTION TELLTALE ILLUMINATION:

Telltale illuminates and remains illuminated after ignition locking system is activated and if necessary the vehicle is driven at least 2 minutes as specified in section 13.12. B.

X Yes No (Fail)

Telltale illuminated when engine was started, no driving required.

X Yes (Pass) No

Driving was required to illuminate telltale. Yes X No

When driving was required, telltale illuminated before vehicle speed of 48 ± 8 km/h (30 ± 5 mph) was reached.

X NA Yes (Pass) No

If driving required, approximate driving time below vehicle speed of 48 ± 8 km/h (30 ± 5 mph) to activate telltale.

 Seconds

When driving was required, telltale illuminated after a vehicle speed above 48 ± 8 km/h (30 ± 5 mph) was reached.

X NA Yes No

If driving required, time for telltale to illuminate after starting system is activated and vehicle speed of 48 ± 8 km/h (30 ± 5 mph) is reached.

 Seconds (must be within 2 minutes) Pass Fail

3.0 TEST DATA....continued

DATA SHEET 9 (Sheet 2 of 6)
MALFUNCTION WARNING TEST
(Test Number 1)

Identify all other telltales and/or warning messages activated upon simulating subject ESC system malfunction. ESC, ABS, TPMS malfunction and Check Engine telltales illuminated.

Did the malfunction telltale re-illuminate after the starting system was shut off for five minutes and then turned back on with the engine running?

X Yes (Pass) No (Fail)

ESC SYSTEM RESTORATION:

Describe method used to restore system to normal operation: Reconnect the Right Front wheel speed sensor connector

After system restoration is completed, telltale extinguishes after vehicle starting system is activated and if necessary the vehicle is driven at least 2 minutes as specified in section 13.12. D.

X Yes No (Fail)

Telltale extinguished when engine was started, no driving required.

X Yes (Pass) No

Driving was required to extinguish telltale. Yes X No

When driving was required, telltale extinguished before vehicle speed of 48 ± 8 km/h (30 ± 5 mph) was reached.

X NA Yes (Pass) No

If driving required, approximate driving time below vehicle speed of 48 ± 8 km/h (30 ± 5 mph) to extinguish telltale.

Seconds

3.0 TEST DATA....continued

DATA SHEET 9 (Sheet 3 of 6)
MALFUNCTION WARNING TEST
(Test Number 1)

When driving was required, telltale extinguished after a vehicle speed above 48 ± 8 km/h (30 ± 5 mph) was reached.

X NA Yes No

If driving required, time for telltale to extinguish after starting system is activated and vehicle speed of 48 ± 8 km/h (30 ± 5 mph) is reached.

 Seconds (must be within 2 minutes) Pass Fail

DATA INDICATES COMPLIANCE:

PASS/FAIL PASS

REMARKS:

After the Right Front wheel speed sensor was reconnected, the ESC, ABS, and TPMS malfunction telltales extinguished without driving. However, the check engine light remained illuminated.

DTC Code P0500 (Vehicle Speed Sensor A) was scanned and cleared with an OBD II scan tool.

RECORDED BY: Alan Ida
APPROVED BY: John Phillips

DATE: 8-28-14
DATE: 8-29-14

3.0 TEST DATA....continued

DATA SHEET 9 (Sheet 4 of 6)
MALFUNCTION WARNING TEST
(Test Number 2)

VEHICLE MAKE/MODEL/BODY STYLE: Mazda / 3 / Passenger Car

VEHICLE NHTSA No.: C20145406 TEST DATE: 8-28-14

METHOD OF MALFUNCTION SIMULATION:

Describe method of malfunction simulation: Remove the 30-amp ABS / DSCS fuse (#9) from the underhood fuse box.

MALFUNCTION TELLTALE ILLUMINATION:

Telltale illuminates and remains illuminated after ignition locking system is activated and if necessary the vehicle is driven at least 2 minutes as specified in section 13.12. B.

X Yes No (Fail)

Telltale illuminated when engine was started, no driving required.

X Yes (Pass) No

Driving was required to illuminate telltale. Yes X No

When driving was required, telltale illuminated before vehicle speed of 48 ± 8 km/h (30 ± 5 mph) was reached.

X NA Yes (Pass) No

If driving required, approximate driving time below vehicle speed of 48 ± 8 km/h (30 ± 5 mph) to activate telltale.

 Seconds

When driving was required, telltale illuminated after a vehicle speed above 48 ± 8 km/h (30 ± 5 mph) was reached.

X NA Yes No

If driving required, time for telltale to illuminate after starting system is activated and vehicle speed of 48 ± 8 km/h (30 ± 5 mph) is reached.

 Seconds (must be within 2 minutes) Pass Fail

3.0 TEST DATA....continued

DATA SHEET 9 (Sheet 5 of 6)
MALFUNCTION WARNING TEST
(Test Number 2)

Identify all other telltales and/or warning messages activated upon simulating subject ESC system malfunction. ESC, ESC Off, ABS, Brake, Power Steering, BSM Off (Blind Spot Monitoring System) - flashing, TPMS – flashing, and Check Engine malfunction telltales illuminated.

Did the malfunction telltale re-illuminate after the starting system was shut off for five minutes and then turned back on with the engine running?

X Yes (Pass) No (Fail)

ESC SYSTEM RESTORATION:

Describe method used to restore system to normal operation: Reinstall the 30-amp ABS / DSCS fuse in the underhood fuse box.

After system restoration is completed, telltale extinguishes after vehicle starting system is activated and if necessary the vehicle is driven at least 2 minutes as specified in section 13.12. D.

X Yes No (Fail)

Telltale extinguished when engine was started, no driving required.

X Yes (Pass) No

Driving was required to extinguish telltale. Yes X No

When driving was required, telltale extinguished before vehicle speed of 48 ± 8 km/h (30 ± 5 mph) was reached.

X NA Yes (Pass) No

If driving required, approximate driving time below vehicle speed of 48 ± 8 km/h (30 ± 5 mph) to extinguish telltale.

_____ Seconds

3.0 TEST DATA....continued

DATA SHEET 9 (Sheet 6 of 6)
MALFUNCTION WARNING TEST
(Test Number 2)

When driving was required, telltale extinguished after a vehicle speed above 48 ± 8 km/h (30 ± 5 mph) was reached.

NA Yes No

If driving required, time for telltale to extinguish after starting system is activated and vehicle speed of 48 ± 8 km/h (30 ± 5 mph) is reached.

Seconds (must be within 2 minutes) Pass Fail

DATA INDICATES COMPLIANCE: PASS/FAIL PASS

REMARKS:

After the 30-amp ABS / DSCS fuse was removed, the engine could only be turned off by pressing and holding the Start / Stop ignition button for 3 seconds. This set the ignition to the ACC position. The Start / Stop button required 2 additional presses in order to turn off the ignition completely.

After reinstalling the 30 amp ABS / DSCS fuse, the ESC, ESC Off, ABS, Brake, Power Steering, BSM Off, and TPMS malfunction telltales extinguished. However, the Check Engine telltale remained illuminated.

DTC Code U0121 was scanned and cleared with an OBD II scan tool.

RECORDED BY: Alan Ida
APPROVED BY: John Phillips

DATE: 8-28-14
DATE: 8-29-14

4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

Type	Output	Range	Resolution	Accuracy	Specifics	Serial Number	Calibration
Tire Pressure Gauge	Vehicle Tire Pressure	0-99 psi	0.01 psi	±0.5% of applied pressure	Intercomp Model: 360045	<u>0113SS11051</u>	By: <u>TRC Inc.</u> Date: <u>7-14-14</u> Due: <u>10-14-14</u>
Platform Scales	Vehicle Total, Wheel, and Axle Load	0-2500 lb per each of four pads	0.5 lb	±1.0% of applied load	Mettler Toledo Model: JXGA1000	<u>5225831-5JC</u>	By: <u>Mettler Toledo</u> Date: <u>5-27-14</u> Due: <u>8-31-14</u>
Automated Steering Machine with Steering Angle Encoder	Handwheel Angle	±800 deg	0.25 deg	±0.25 deg	Heitz Automotive Testing Model: Sprint 3	<u>60303</u>	By: <u>ATI-Heitz</u> Date: <u>4-07-14</u> Due: <u>4-07-15</u>
Multi-Axis Inertial Sensing System	Longitudinal, Lateral, and Vertical Acceleration Roll, Yaw, and Pitch Rate	Accelerometers: ±2 g Angular Rate Sensors: ±100 deg/s	Accelerometers: ≤10 ug Angular Rate Sensors: ≤0.004 deg/s	Accelerometers: ≤0.05% of full range Angular Rate Sensors: 0.05% of full range	BEI Technologies Model: MotionPAK MP-1	<u>0768</u>	By: <u>BEI Tech.</u> Date: <u>4-03-14</u> Due: <u>4-03-15</u>
Radar Speed Sensor and Dashboard Display	Vehicle Speed	0-125 mph	0.009 mph	±0.25% of full scale	A-DAT Corp. Radar Model: DRS-6 Display Model: RD-2	<u>1400603</u>	By: <u>TRC Inc.</u> Date: <u>3-18-14</u> Due: <u>3-18-15</u>
Ultrasonic Distance Measuring System	Left and Right Side Vehicle Height	5-24 inches	0.01 inches	±0.25% of maximum distance	Massa Products Corporation Model: M-5000/220	<u>104619</u> & <u>104613</u>	By: <u>Consumers Energy Laboratory Services</u> Date: <u>2-25-14</u> Due: <u>2-25-15</u>
Data Acquisition System [Amplify, Anti-Alias, and Digitize]	Record Time; Velocity; Distance; Lateral, Longitudinal, and Vertical Accelerations; Roll, Yaw, and Pitch Rates; Steering Wheel Angle.	Sufficient to meet or exceed individual sensors	200 Hz	Sufficient to meet or exceed individual sensors	Dewetron Sidehand DAS Model: DA-121 Digitizer Model: Dewe-Orion-1616-100 Amplifier/AntiAliasing: MDAQ-FILT-10-S	<u>12061105</u>	By: <u>TRC Inc.</u> Date: <u>1-22-14</u> Due: <u>1-22-15</u>
Load Cell	Vehicle Brake Pedal Force	0-300 lb	1 lb	±0.05% of full scale	DATRON Model: DTM-LPA	<u>4970-1103</u>	By: <u>TRC Inc.</u> Date: <u>per test</u> Due: <u>per test</u>
Coordinate Measurement Machine	Inertial Sensing System Location	0-10 feet	0.001 inch	±0.003% of full scale	FARO International Model: Faro Arm N10	<u>N10-02-03-01310</u>	By: <u>FARO</u> Date: <u>8-29-13</u> Due: <u>8-29-14</u>
Outriggers	No output. Safety Item.	N/A	N/A	N/A	NHTSA Titanium Outriggers Model: Docket 2007-27662-11	N/A	N/A

5.0 PHOTOGRAPHS

- 5.1 3/4 FRONT VIEW FROM LEFT SIDE OF VEHICLE
- 5.2 3/4 REAR VIEW FROM RIGHT SIDE OF VEHICLE
- 5.3 VEHICLE CERTIFICATION LABEL
- 5.4 TIRE AND LOADING INFORMATION LABEL
- 5.5 WINDOW STICKER (MONRONEY LABEL)
- 5.6 ESC OFF TELLTALE
- 5.7 ESC MALFUNCTION TELLTALE
- 5.8 ESC OFF CONTROL LOCATION
- 5.9 ESC OFF CONTROL
- 5.10 3/4 FRONT VIEW - TEST VEHICLE INSTRUMENTED
- 5.11 3/4 REAR VIEW – TEST VEHICLE INSTRUMENTED
- 5.12 STEERING WHEEL CONTROLLER AND DATA ACQUISITION SYSTEM
- 5.13 STEERING CONTROLLER BATTERY BOX
- 5.14 INERTIA MEASUREMENT UNIT
- 5.15 VEHICLE SPEED SENSOR
- 5.16 BODY ROLL SENSOR (DRIVER SIDE)
- 5.17 BODY ROLL SENSOR (PASSENGER SIDE)
- 5.18 BRAKE PEDAL FORCE TRANSDUCER

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2014 MAZDA3
FMVSS 126
VEHICLE No.: C20145406
AUGUST 2014

5.1 ¾ FRONT VIEW FROM LEFT SIDE OF VEHICLE



2014 MAZDA3
FMVSS 126
VEHICLE No.: C20145406
AUGUST 2014

5.2 ¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE

MFD. BY MAZDA MOTOR CORPORATION

DATE	GVWR/PNBV	GAWR/PNBE FRT	GAWR/PNBE RR
06/14	4001 LB	2149 LB	1870 LB
	1815 KG	975 KG	848 KG

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY
, BUMPER, AND THEFT PREVENTION
STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

JM1BM1V74E1215505 TYPE: PASS CAR



BODY COLOR CODE: 41V

MADE IN JAPAN

2014 MAZDA3
FMVSS 126
VEHICLE No.: C20145406
AUGUST 2014



TIRE AND LOADING INFORMATION RENSEIGNEMENTS SUR LES PNEUS ET LE CHARGEMENT

SEATING CAPACITY | TOTAL 5 | FRONT AVANT 2 | REAR ARRIERE 3
NOMBRE DE PLACES |

The combined weight of occupants and cargo should never exceed 385 kg or 850 lbs.*
Le poids total des occupants et du chargement ne doit jamais dépasser 385 kg ou 850 lb.*

63

TIRE PNEU	SIZE DIMENSIONS	COLD TIRE PRESSURE PRESSION DES PNEUS À FROID	SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION
FRONT AVANT	P205/60R16	250 kPa, 36 psi	VOIR LE MANUEL DE L'USAGER POUR PLUS DE RENSEIGNEMENTS
REAR ARRIÈRE	P205/60R16	250 kPa, 36 psi	
SPARE DE SECOURS	T125/70D16	420 kPa, 60 psi	

(BHN2A)

2014 MAZDA3
FMVSS 126
VEHICLE No.: C20145406
AUGUST 2014



MAZDA[®]

SKYACTIV[®]
TECHNOLOGY

Scan for
Vehicle
Info and offers

2014 **MAZDA3**

Model:
2014 MAZDA3 I 4-DOOR TOURING
Exterior Color:
SOUL RED METALLIC
Interior Color:
BLACK

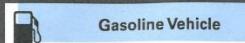
**EPA
DOT Fuel Economy and Environment**

Fuel Economy

34 MPG
combined city/hwy
30 city
41 highway
2.9 gallons per 100 miles

Annual fuel Cost
\$1,550

Compact Cars range from 14 to 105 MPG.
The best vehicle rates 121 MPG.



Gasoline Vehicle

You Save
\$3,750

**in fuel costs
over 5 years**
compared to the
average new vehicle.

Fuel Economy & Greenhouse Gas Rating (tailpipe only)



This vehicle emits 202 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and

actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 23 MPG and costs \$1,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$3.50 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov

Calculate personalized estimates and compare vehicles

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score

Based on the combined ratings of frontal, side and rollover.

Should ONLY be compared to other vehicles of similar size and weight.



**Frontal
Crash**

Driver
Passenger



Based on the risk of injury in a frontal impact.

Should ONLY be compared to other vehicles of similar size and weight.

**Side
Crash**

Front seat
Rear seat



Based on the risk of injury in a side impact.

Rollover



Based on the risk of rollover in a single vehicle crash.

Star ratings range from 1 to 5 stars (★ ★ ★ ★) with 5 being the highest.

Source: National Highway Traffic Safety Administration (NHTSA)

www.safercar.gov or 1-888-327-4236

SOLD TO: 60249
BROWN MAZDA
5625 WEST CENTRAL AVENUE
TOLEDO, OH 43615

SHIP TO: 60249
BROWN MAZDA
5625 WEST CENTRAL AVENUE
TOLEDO, OH 43615

LP

JM1BM1V74E1215505



M3S-ITR-A-BHN4NAH-TA-TA-20140722

MAZDAUSA.COM

**PARTS CONTENT
INFORMATION:**

FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT:

0%

MAJOR SOURCES OF FOREIGN
PARTS CONTENT: JAPAN 85%

NOTE: PARTS CONTENT DOES
NOT INCLUDE FINAL ASSEMBLY,
DISTRIBUTION, OR OTHER
NON-PARTS COSTS.

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT:
HOFU, JAPAN
COUNTRY OF ORIGIN:
ENGINE: JAPAN
TRANSMISSION: JAPAN



This label is affixed pursuant to the Federal
Automobile Disclosure Act. Gasoline, License
and Title fees, State and Local taxes, and
Dealer installed options are not included.

ENGINE/MECHANICAL FEATURES

- SKYACTIV-G 2.0L DOHC 4-CYL ENGINE
- SKYACTIV-DRIVE 6-SPEED AUTO TRANS
- 155 HORSEPOWER, 150 LB-FT TORQUE

EXTERIOR FEATURES

- 16-INCH ALLOY WHEELS
- P205/60 R16 ALL-SEASON TIRES
- VARIABLE INTERMITTENT WIPERS
- POWER SIDE MIRRORS W/TURN LAMPS
- HEATED SIDE MIRRORS

INTERIOR FEATURES

- PREMIUM CLOTH-TRIMMED SPORT SEATS
- 6-WAY MANUAL DRIVER'S SEAT
- AIR CONDITIONING W/POLLEN FILTER
- POWER AUTOMATIC DOOR LOCKS
- POWER WINDOWS W/DRIVER ONE-TOUCH
- ADVANCED KEYLESS ENTRY SYSTEM
- PUSH BUTTON ENGINE START
- 60/40 SPLIT FOLD-DOWN REAR SEAT
- REAR SEAT ARMREST W/CUPHOLDERS
- DUAL MAP LIGHTS/VANITY MIRRORS
- CARPETED FLOOR MATS

SAFETY AND SECURITY FEATURES

- 36-MONTH/36,000 MILE "BUMPER-TO-BUMPER" WARRANTY
- 60 MONTH/60,000 MILE POWERTRAIN WARRANTY
- 24-HOUR ROADSIDE ASSISTANCE
- 5-PASSENGER 3-POINT SAFETY BELTS
- LATCH CHILD SAFETY SEAT ANCHORS
- ANTI-THEFT ENGINE IMMOBILIZER
- BLIND SPOT MONITORING
- REAR CROSS TRAFFIC ALERT

■ DYNAMIC STABILITY CONTROL

■ TRACTION CONTROL SYSTEM

■ HILL LAUNCH ASSIST

■ ANTI-LOCK BRAKE SYSTEM

■ WITH EBD & BRAKE ASSIST

■ ADVANCED DUAL FRONT AIR BAGS

■ FRONT SIDE-IMPACT AIR BAGS

■ FRONT & REAR SIDE AIR CURTAINS

■ TIRE PRESSURE MONITORING SYSTEM

MSRP \$20,645

OPTIONAL EQUIPMENT

FOG
ILK
JCR
1AP
1MR

FOG LIGHTS
INTERIOR LIGHTING KIT
SOUL RED METALLIC PAINT CHARGE
APPEARANCE PACKAGE
MOONROOF PACKAGE 1
MOONROOF W/ONE-TOUCH OPEN

\$370
\$250
\$300
\$1,300
\$800

■ ILLUMINATED VANITY MIRRORS

Total Vehicle and Options
Delivery, Processing and Handling Fee
\$23,665
\$795

Total MSRP \$24,460

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5.5 WINDOW STICKER - MONRONEY LABEL

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5.6 ESC OFF TELLTALE



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2014 MAZDA3
FMVSS 126
VEHICLE No.: C20145406
AUGUST 2014

5.7 ESC MALFUNCTION TELLTALE



5.8 ESC OFF CONTROL LOCATION

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BSM
OFF



SET



2014 MAZDA3
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5.9 ESC OFF CONTROL

45



2014 MAZDA3
FMVSS 126
VEHICLE No.: C20145406
AUGUST 2014

5.10 ¾ FRONT VIEW - TEST VEHICLE INSTRUMENTED

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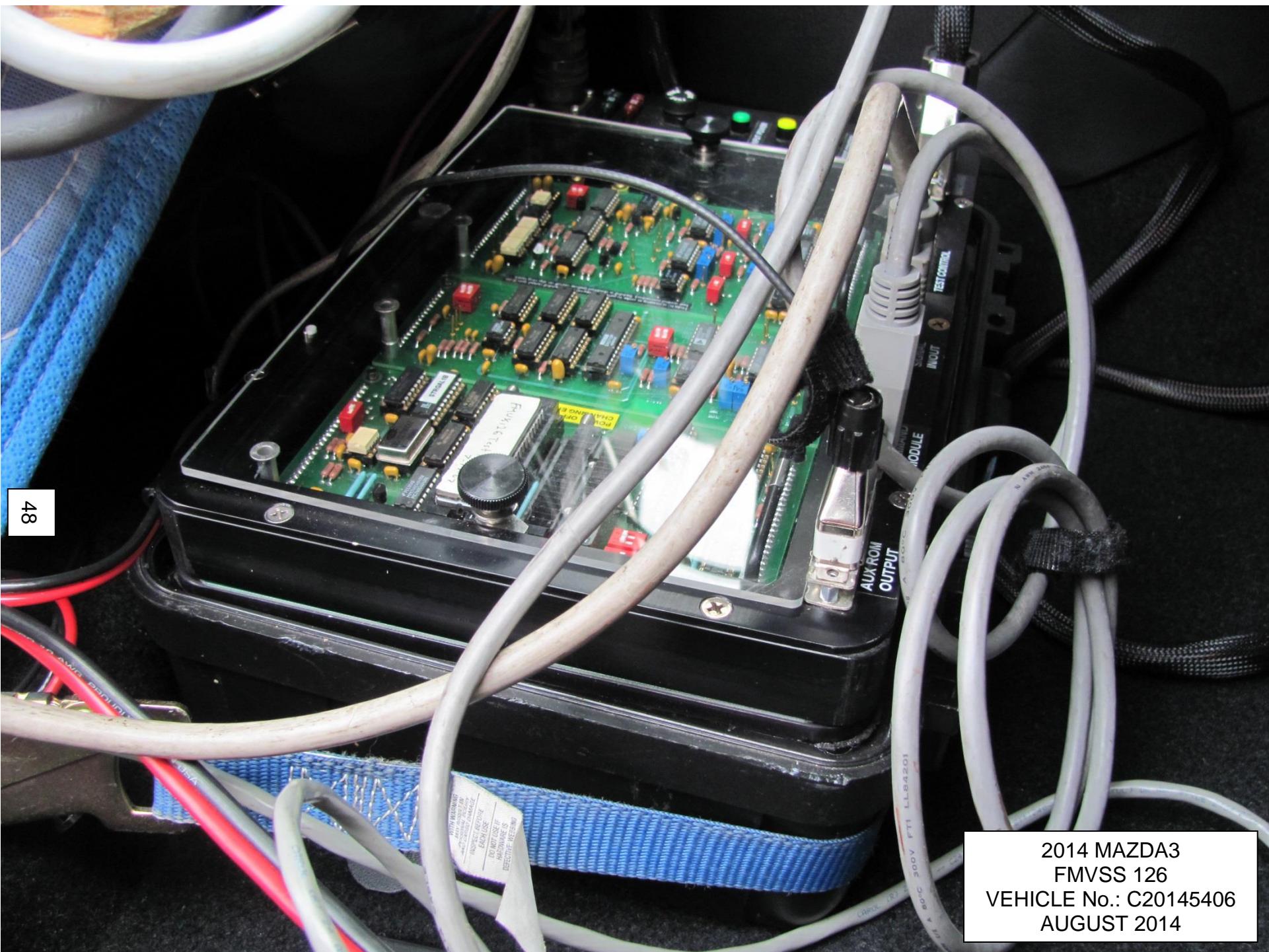


2014 MAZDA3
FMVSS 126
VEHICLE No.: C20145406
AUGUST 2014

5.11 ¾ REAR VIEW - TEST VEHICLE INSTRUMENTED



5.12 STEERING WHEEL CONTROLLER AND DATA ACQUISITION SYSTEM



2014 MAZDA3
FMVSS 126
VEHICLE No.: C20145406
AUGUST 2014

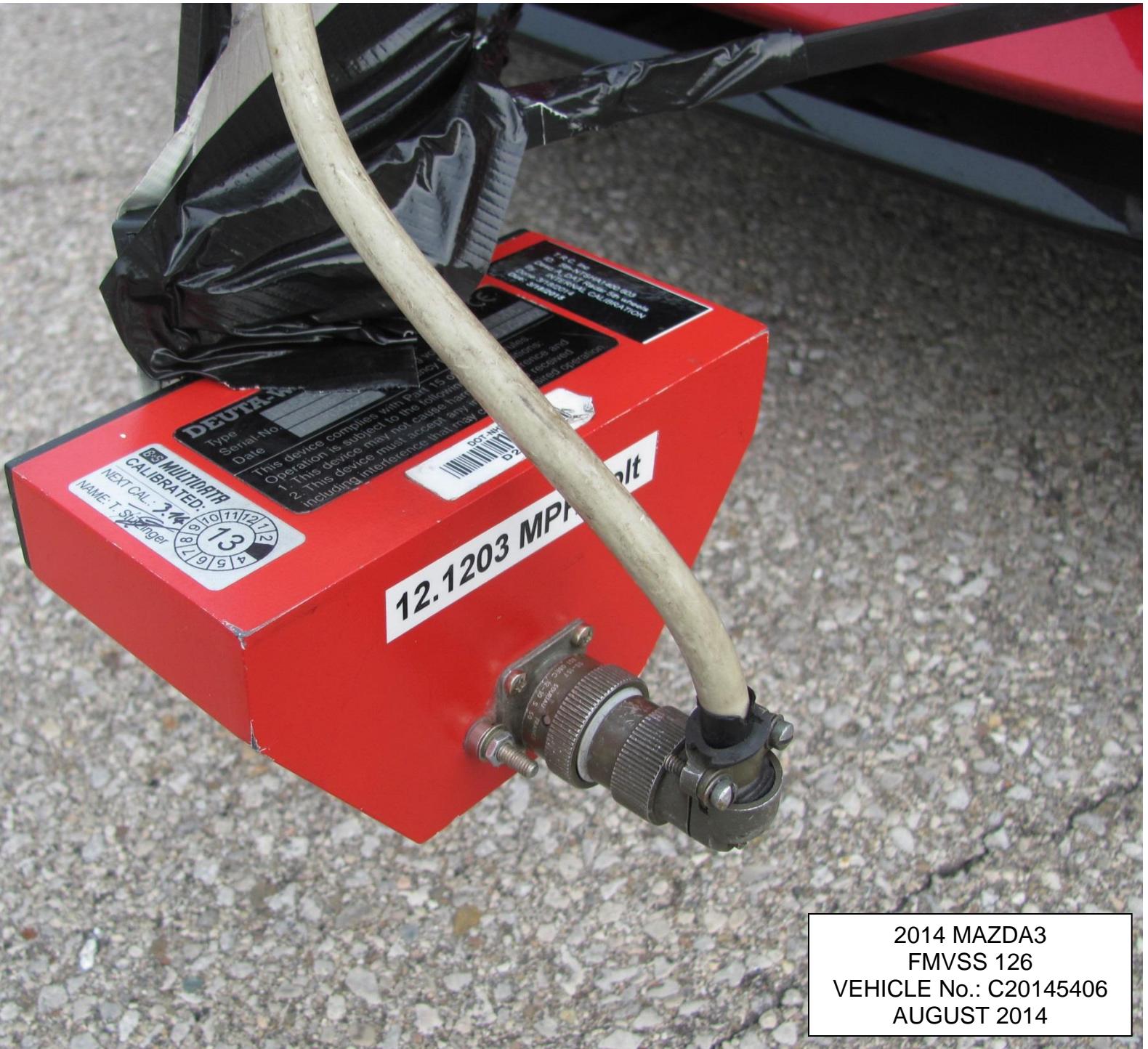
5.13 STEERING CONTROLLER BATTERY BOX



49

2014 MAZDA3
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5.14 INERTIA MEASUREMENT UNIT



2014 MAZDA3
FMVSS 126
VEHICLE No.: C20145406
AUGUST 2014

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2014 MAZDA3
FMVSS 126
VEHICLE No.: C20145406
AUGUST 2014

5.16 BODY ROLL SENSOR (DRIVER SIDE)

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2014 MAZDA3
FMVSS 126
VEHICLE No.: C20145406
AUGUST 2014

5.17 BODY ROLL SENSOR (PASSENGER SIDE)

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2014 MAZDA3
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VEHICLE No.: C20145406
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5.18 BRAKE PEDAL FORCE TRANSDUCER

6.0 DATA PLOTS

Figure 1. Steering Angle and Yaw Rate Time History, Counter-Clockwise Initial Steer Tests

Figure 2. Steering Angle, Lateral Acceleration, and Lateral Displacement Time History, Counter-Clockwise Initial Steer Tests

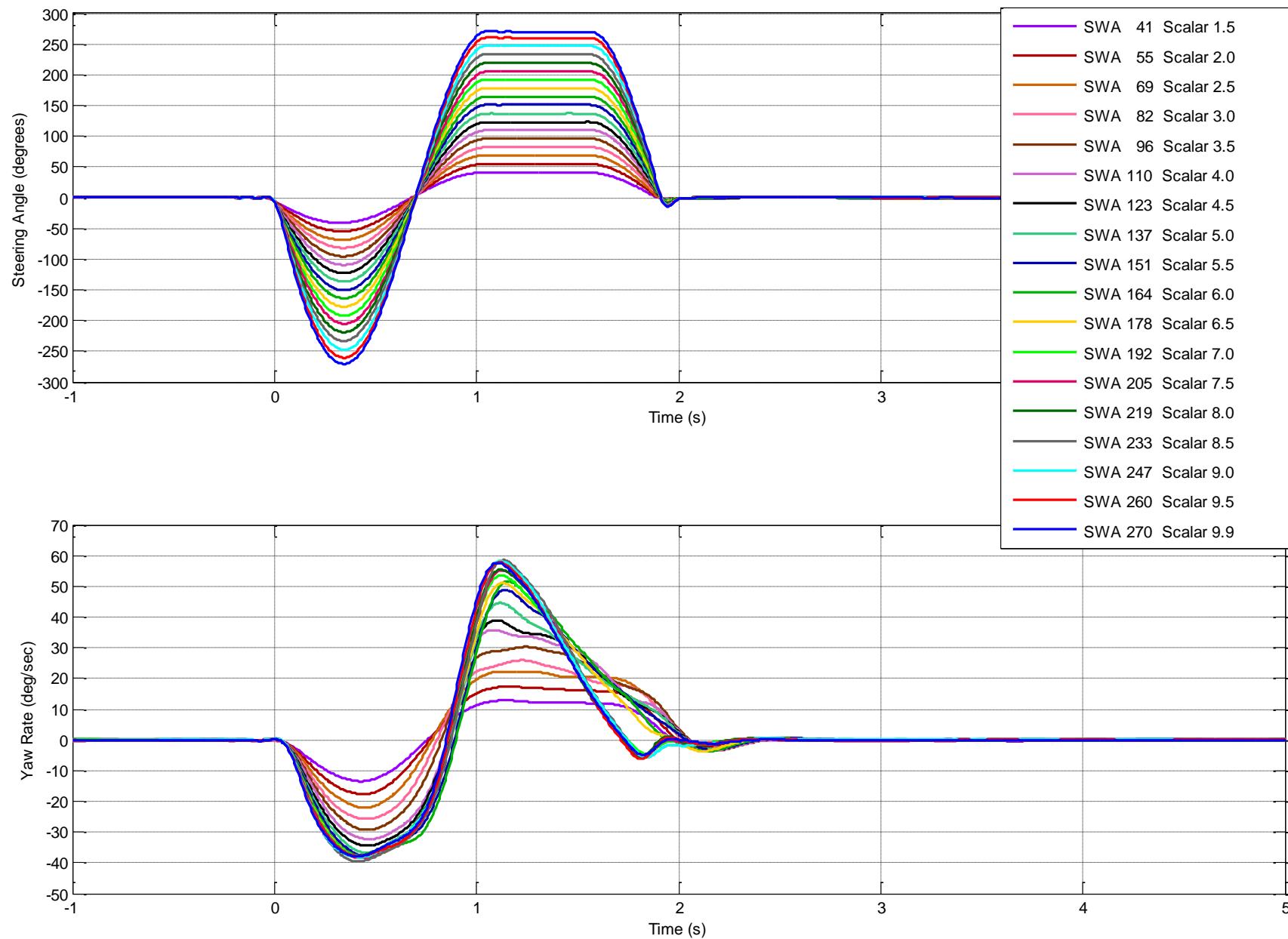
Figure 3. Steering Angle and Yaw Rate Time History, Clockwise Initial Steer Tests

Figure 4. Steering Angle, Lateral Acceleration, and Lateral Displacement Time History, Clockwise Initial Steer Tests

6.0 2014 MAZDA3 DATA PLOTS

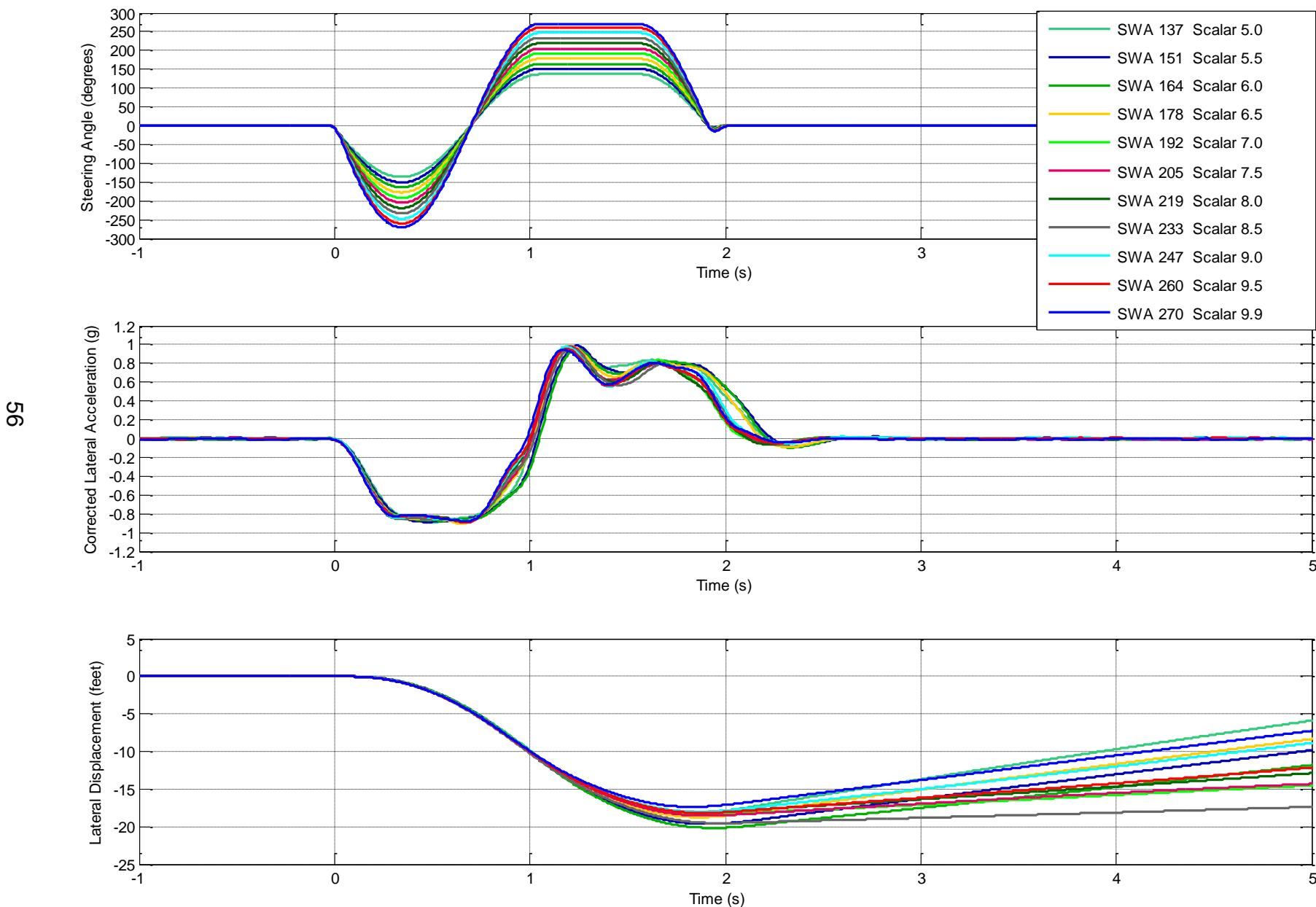
Figure 1. Steering Angle and Yaw Rate Time History, Counter-Clockwise Initial Steer Tests

SS



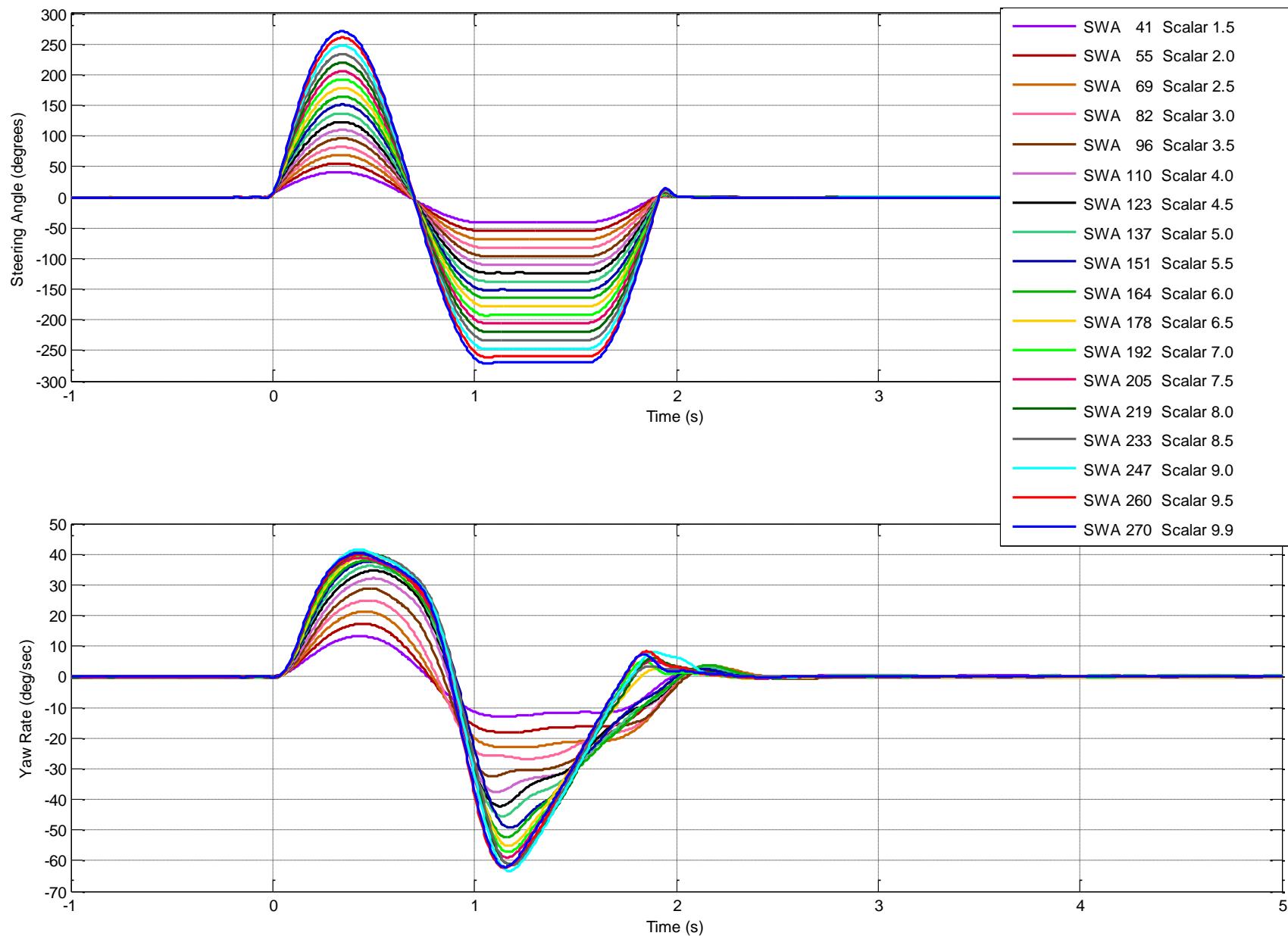
6.0 2014 MAZDA3 DATA PLOTS...continued

Figure 2. Steering Angle, Lateral Acceleration, and Lateral Displacement Time History, Counter-Clockwise Initial Steer Tests



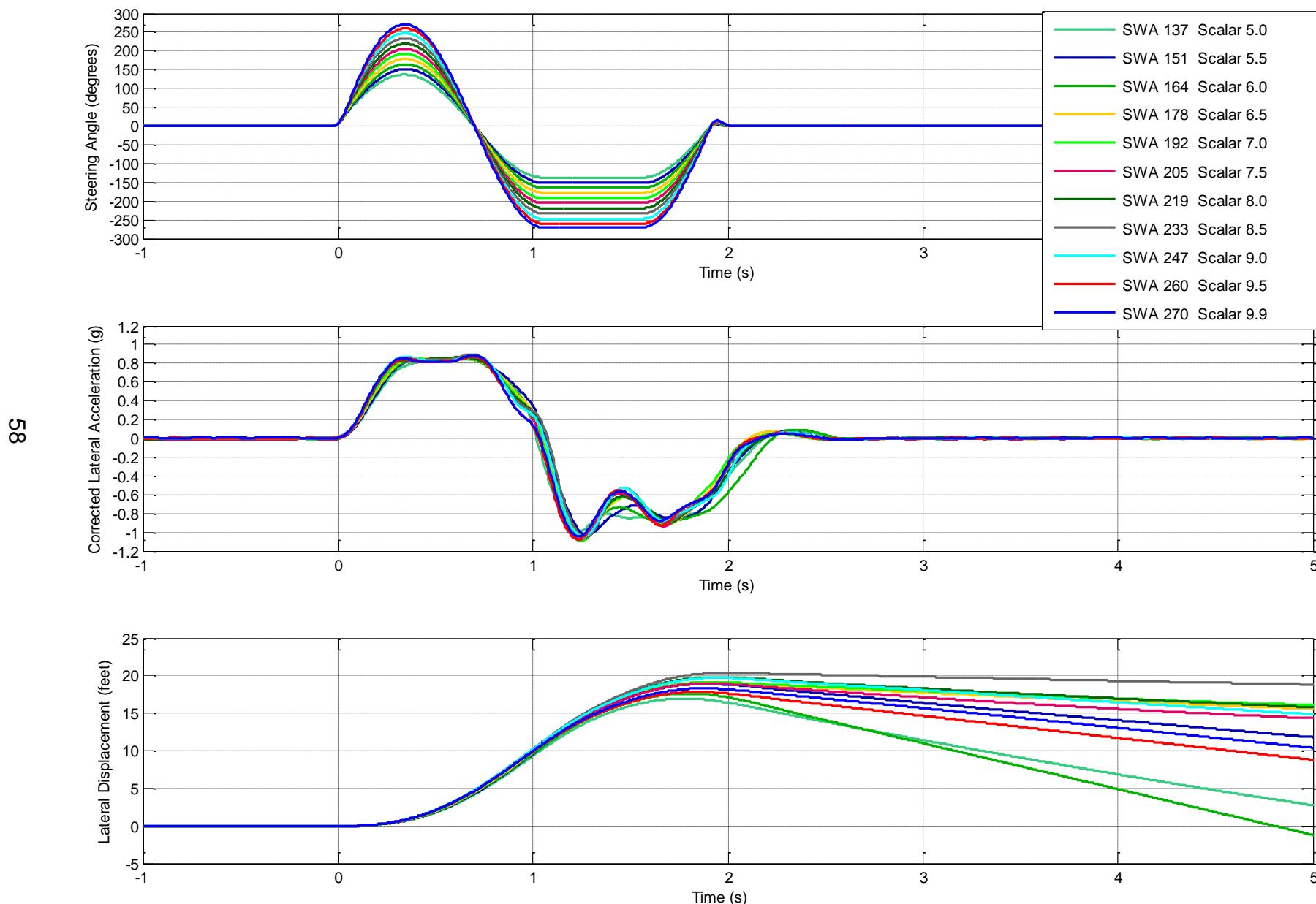
6.0 2014 MAZDA3 DATA PLOTS...continued

Figure 3. Steering Angle and Yaw Rate Time History, Clockwise Initial Steer Tests



6.0 2014 MAZDA3 DATA PLOTS...continued

Figure 4. Steering Angle, Lateral Acceleration, and Lateral Displacement Time History, Clockwise Initial Steer Tests



7.0 OTHER DOCUMENTATION

- 7.1 OWNER'S MANUAL PAGES
- 7.2 VEHICLE ARRIVAL CONDITION REPORT
- 7.3 VEHICLE COMPLETION CONDITION REPORT
- 7.4 SINE WITH DWELL TEST RESULTS
- 7.5 SLOWLY INCREASING STEER TEST RESULTS
- 7.6 INERTIA SENSOR MEASUREMENTS

7.1 OWNER'S MANUAL PAGES

When Driving
Instrument Cluster and Display

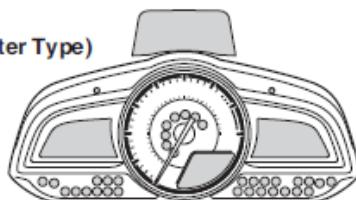
Warning/Indicator Lights

Instrument Cluster varies depending on model and specifications.

Instrument Cluster

Type A

(Digital Speed Meter Type)



Type B

(Analog Speed Meter Type (With Tachometer))

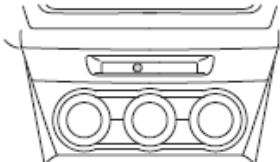


Type C

(Analog Speed Meter Type (Without Tachometer))



Center of Dashboard



Warning/Indicator lights will appear in any of the highlighted areas

4-21

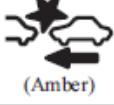
2014 MAZDA3
FMVSS 126
VEHICLE No.: C20145406
AUGUST 2014

7.1 OWNER'S MANUAL PAGES

Instrument Cluster and Display

▼ Indicator Lights

These lights turn on or flash to notify the user of the system operation status or a system malfunction.

Signal	Indicator Lights	Page
BSM OFF	* BSM OFF Indicator Light	4-114
 (Green)	* Lane Departure Warning System (LDWS) Indicator Light	4-122
 (Green)	KEY Indicator Light	3-9
 (Green)	* High Beam Control System (HBC) Indicator Light	4-50
	Wrench Indicator Light* ¹	4-26
	TCS/DSC Indicator Light* ¹	4-80, 4-81
	DSC OFF Indicator Light* ¹	4-82
AFS OFF	* AFS OFF Indicator Light* ¹	4-46
 (Amber)	* Forward Obstruction Warning/Smart City Brake Support (FOW/SCBS) Indicator Light* ¹	4-78
	* Forward Obstruction Warning/Smart City Brake Support (FOW/SCBS) OFF Indicator Light* ¹	4-78
i-ELOOP	* i-ELOOP Indicator Light	4-85
 (Blue)	Low Engine Coolant Temperature Indicator Light	4-26

4-24 *Some models.

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7.1 OWNER'S MANUAL PAGES

Traction Control System (TCS)

The Traction Control System (TCS) enhances traction and safety by controlling engine torque and braking. When the TCS detects driving wheel slippage, it lowers engine torque and operates the brakes to prevent loss of traction.

This means that on a slick surface, the engine adjusts automatically to provide optimum power to the drive wheels, limiting wheel spin and loss of traction.

The warning light turns on when the system has a malfunction.

Refer to Warning Lights on page 4-22.

WARNING

Do not rely on the Traction Control System (TCS) as a substitute for safe driving:

The Traction Control System (TCS) cannot compensate for unsafe and reckless driving, excessive speed, tailgating (following another vehicle too closely), and hydroplaning (reduced tire friction and road contact because of water on the road surface). You can still have an accident.

Use snow tires or tire chains and drive at reduced speeds when roads are covered with ice and/or snow:

Driving without proper traction devices on snow and/or ice-covered roads is dangerous. The Traction Control System (TCS) alone cannot provide adequate traction and you could still have an accident.

NOTE

To turn off the TCS, press the DSC OFF switch (page 4-82).

▼ TCS/DSC Indicator Light



This indicator light stays on for a few seconds when the ignition is switched ON. If the TCS or DSC is operating, the indicator light flashes.

If the light stays on, the TCS, DSC or the brake assist system may have a malfunction and they may not operate correctly. Take your vehicle to an Authorized Mazda Dealer.

NOTE

- In addition to the indicator light flashing, a slight lugging sound will come from the engine. This indicates that the TCS/DSC is operating properly.*
- On slippery surfaces, such as fresh snow, it will be impossible to achieve high rpm when the TCS is on.*

Dynamic Stability Control (DSC)

The Dynamic Stability Control (DSC) automatically controls braking and engine torque in conjunction with systems such as ABS and TCS to help control side slip when driving on slippery surfaces, or during sudden or evasive maneuvering, enhancing vehicle safety.

Refer to ABS (page 4-79) and TCS (page 4-80).

DSC operation is possible at speeds greater than 20 km/h (12 mph).

The warning light turns on when the system has a malfunction.

Refer to Warning Lights on page 4-22.

⚠ WARNING

Do not rely on the Dynamic Stability Control as a substitute for safe driving:

The Dynamic Stability Control (DSC) cannot compensate for unsafe and reckless driving, excessive speed, tailgating (following another vehicle too closely), and hydroplaning (reduced tire friction and road contact because of water on the road surface). You can still have an accident.

⚠ CAUTION

- *The DSC may not operate correctly unless the following are observed:*
 - *Use tires of the correct size specified for your Mazda on all four wheels.*
 - *Use tires of the same manufacturer, brand and tread pattern on all four wheels.*
 - *Do not mix worn tires.*
- *The DSC may not operate correctly when tire chains are used or a temporary spare tire is installed because the tire diameter changes.*

▼ TCS/DSC Indicator Light



This indicator light stays on for a few seconds when the ignition is switched ON. If the TCS or DSC is operating, the indicator light flashes.

If the light stays on, the TCS, DSC or the brake assist system may have a malfunction and they may not operate correctly. Take your vehicle to an Authorized Mazda Dealer.

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2014 MAZDA3
FMVSS 126
VEHICLE No.: C20145406
AUGUST 2014

7.1 OWNER'S MANUAL PAGES

▼ **DSC OFF Indicator Light**



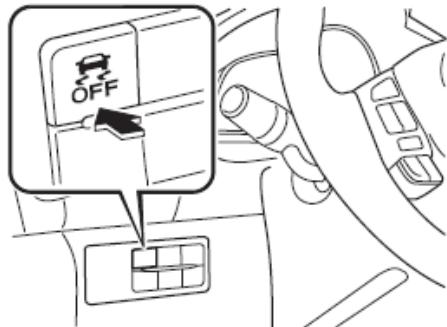
This indicator light stays on for a few seconds when the ignition is switched ON. It also illuminates when the DSC OFF switch is pressed and TCS/DSC is switched off.

Refer to DSC OFF Switch on page 4-82.

If the light remains illuminated and the TCS/DSC is not switched off, take your vehicle to an Authorized Mazda Dealer. The DSC may have a malfunction.

▼ **DSC OFF Switch**

Press the DSC OFF switch to turn off the TCS/DSC. The DSC OFF indicator light in the instrument cluster will illuminate.



Press the switch again to turn the TCS/DSC back on. The DSC OFF indicator light will turn off.

NOTE

- When DSC is on and you attempt to free the vehicle when it is stuck, or drive it out of freshly fallen snow, the TCS (part of the DSC system) will activate. Depressing the accelerator will not increase engine power and freeing the vehicle may be difficult. When this happens, turn off the TCS/DSC.
- If the TCS/DSC is off when the engine is turned off, it automatically activates when the ignition is switched ON.
- Leaving the TCS/DSC on will provide the best traction.
- If the DSC OFF switch is pressed and held for 10 seconds or more, the DSC OFF switch malfunction detection function operates and the DSC system activates automatically. The DSC OFF indicator light turns off while the DSC system is operative.

7.2 VEHICLE ARRIVAL CONDITION REPORT

CONTRACT NO. DTNH22-11-D-00247 DATE: 8/22/14

FROM: Automotive Allies

TO: TRC Inc.
PURPOSE: (X) Initial () Received () Present
Receipt via Transfer vehicle condition

MODEL YEAR/MAKE/MODEL/BODY STYLE: 2014 / Mazda / 3 / Passenger Car

MANUFACTURE DATE: 06/14 NHTSA NO.: C20145406

BODY COLOR: Red VIN: JM1BM1V74E1215505

ODOMETER READING: 4 miles GVWR: 1,815 KG

PURCHASE PRICE: \$ rented / leased DEALER'S NAME: Automotive Allies,
209 W. Alameda Avenue, Suite 101, Burbank, CA 91502

- ALL OPTIONS LISTED ON "WINDOW STICKER" ARE PRESENT ON THE TEST VEHICLE
- TIRES AND WHEEL RIMS ARE NEW AND THE SAME AS LISTED
- THERE ARE NO DENTS OR OTHER INTERIOR OR EXTERIOR FLAWS
- THE VEHICLE HAS BEEN PROPERLY PREPARED AND IS IN RUNNING CONDITION
- THE GLOVE BOX CONTAINS AN OWNER'S MANUAL, WARRANTY DOCUMENT, CONSUMER INFORMATION, AND EXTRA SET OF KEYS
- PROPER FUEL FILLER CAP IS SUPPLIED ON THE TEST VEHICLE
- PLACE VEHICLE IN STORAGE AREA
- INSPECT THE VEHICLE'S INTERIOR AND EXTERIOR, INCLUDING ALL WINDOWS, SEATS, DOORS, ETC., TO CONFIRM THAT EACH SYSTEM IS COMPLETE AND FUNCTIONAL PER THE MANUFACTURER'S SPECIFICATIONS. ANY DAMAGE, MISADJUSTMENT, OR OTHER UNUSUAL CONDITION THAT COULD INFLUENCE THE TEST PROGRAM OR TEST RESULTS SHALL BE RECORDED. REPORT ANY ABNORMAL CONDITION TO THE NHTSA COTR BEFORE BEGINNING ANY TEST

RECORDED BY: Alan Ida
APPROVED BY: John Phillips

DATE: 8-22-14
DATE: 8-29-14

7.3 VEHICLE COMPLETION CONDITION REPORT

CONTRACT NO. DTNH22-11-D-00247 DATE: 8/28/14

MODEL YEAR/MAKE/MODEL/BODY STYLE: 2014 / Mazda / 3 / Passenger Car

MANUFACTURE DATE: 06/14 NHTSA NO.: C20145406

BODY COLOR: Red VIN: JM1BM1V74E1215505

ODOMETER READING: 59 miles GVWR: 1,815 KG

LIST OF FMVSS TESTS PERFORMED BY THIS LAB: 126, 135

- THERE ARE NO DENTS OR OTHER INTERIOR OR EXTERIOR FLAWS
- THE VEHICLE HAS BEEN PROPERLY MAINTAINED AND IS IN RUNNING CONDITION
- THE GLOVE BOX CONTAINS AN OWNER'S MANUAL, WARRANTY DOCUMENT, CONSUMER INFORMATION, AND EXTRA SET OF KEYS
- PROPER FUEL FILLER CAP IS SUPPLIED ON THE TEST VEHICLE

REMARKS:

Equipment that is no longer on the test vehicle as noted on Vehicle Arrival Condition Report:

None.

Explanation for equipment removal:

N/A

Test Vehicle Condition:

Like new.

RECORDED BY: Alan Ida
APPROVED BY: John Phillips

DATE: 8-28-14
DATE: 8-29-14

7.4 SINE WITH DWELL TEST RESULTS

2014 Mazda3

NHTSA No.: C20145406

Date Created 27-Aug-14

LEFT-TO-RIGHT (INITIAL COUNTER-CLOCKWISE STEER)

∞

File	SWA @ 5deg Ct	MES	Time@5deg	COS	Time@COS	MOS	Time@MOS	YRR1(%)	YR1 (deg/sec)	YRR1 Ct	YRR175(%)	YR175 (deg/sec)
0025	619	50.563	0.092	999	1.994	755	0.775	-1.504	-0.195	1199	-1.857	-0.241
0026	617	50.242	0.083	999	1.991	755	0.772	-0.813	-0.142	1199	-0.193	-0.034
0027	617	50.481	0.081	999	1.993	755	0.773	-1.426	-0.317	1199	-0.736	-0.163
0028	616	50.153	0.079	999	1.994	755	0.774	-0.820	-0.215	1199	-0.022	-0.006
0029	616	50.567	0.077	999	1.994	755	0.774	-0.703	-0.213	1199	0.143	0.043
0030	615	50.298	0.072	999	1.990	755	0.772	-0.187	-0.067	1199	0.109	0.039
0031	615	50.453	0.070	998	1.989	755	0.771	-0.104	-0.041	1198	0.199	0.078
0032	615	50.427	0.070	998	1.989	755	0.771	-0.386	-0.172	1198	-0.300	-0.134
0033	615	50.333	0.071	999	1.990	755	0.773	-0.119	-0.058	1199	0.085	0.042
0034	615	50.435	0.071	999	1.991	755	0.773	0.025	0.013	1199	0.197	0.102
0035	615	50.352	0.070	998	1.989	755	0.773	-0.054	-0.028	1198	-0.002	-0.001
0036	615	50.305	0.072	999	1.991	755	0.774	0.035	0.019	1199	-0.012	-0.006
0037	614	50.296	0.069	998	1.987	755	0.771	0.095	0.052	1198	0.070	0.039
0038	615	50.324	0.071	998	1.989	755	0.773	0.173	0.096	1198	-0.047	-0.026
0039	615	50.414	0.071	998	1.988	755	0.773	0.092	0.054	1198	0.072	0.042
0040	615	50.460	0.073	999	1.990	756	0.775	0.274	0.159	1199	0.286	0.167
0041	615	50.457	0.072	998	1.989	755	0.774	-0.067	-0.039	1198	0.198	0.114
0042	615	50.276	0.071	998	1.987	755	0.773	0.007	0.004	1198	0.018	0.010

RIGHT-TO-LEFT (INITIAL CLOCKWISE STEER)

0043	619	50.236	0.093	1000	1.997	756	0.775	-1.180	0.156	1200	-0.866	0.114
0044	618	50.391	0.085	999	1.994	755	0.774	-0.500	0.091	1199	-0.301	0.055
0045	617	50.399	0.082	999	1.994	755	0.775	-0.769	0.177	1199	-0.264	0.061
0046	617	50.443	0.081	1000	1.996	756	0.776	-0.266	0.069	1200	0.248	-0.064
0047	615	50.370	0.074	999	1.991	755	0.772	0.370	-0.120	1199	0.473	-0.153
0048	615	50.304	0.073	999	1.992	755	0.773	-0.921	0.347	1199	-0.843	0.317
0049	615	50.318	0.072	999	1.991	755	0.772	-0.619	0.261	1199	-0.452	0.191
0050	615	50.157	0.070	998	1.990	755	0.771	-0.740	0.337	1198	-0.527	0.240
0051	614	50.229	0.069	998	1.989	755	0.771	-0.405	0.200	1198	-0.258	0.127
0052	614	50.505	0.069	998	1.988	755	0.771	-0.349	0.183	1198	-0.105	0.055
0053	614	50.383	0.069	998	1.988	755	0.771	-0.152	0.084	1198	-0.106	0.058
0054	615	50.437	0.071	998	1.990	755	0.774	-0.244	0.139	1198	-0.338	0.193
0055	614	50.484	0.068	998	1.986	755	0.770	-0.325	0.191	1198	-0.436	0.256
0056	614	50.489	0.069	998	1.987	755	0.771	-0.291	0.178	1198	-0.217	0.133
0057	615	50.512	0.073	999	1.991	756	0.775	-0.218	0.135	1199	-0.175	0.108
0058	615	50.336	0.072	999	1.991	755	0.775	-0.110	0.070	1199	-0.112	0.071
0059	614	50.325	0.069	998	1.986	755	0.771	-0.175	0.109	1198	-0.128	0.080
0060	615	50.452	0.071	998	1.989	755	0.774	-0.027	0.017	1198	-0.046	0.029

7.4 SINE WITH DWELL TEST RESULTS

2014 Mazda3

NHTSA No.: C20145406

Date Created 27-Aug-14

LEFT-TO-RIGHT (INITIAL COUNTER-CLOCKWISE STEER)

File	YRR175 Ct	2nd Yaw Peak(deg/sec)	2nd Yaw Peak Ct	Lat Disp (ft)	Lat. Acc. 1.07s (g)	1st SWA Peak(deg)	1st SWA Peak Ct	2nd SWA Mean(deg)
0025	1349	12.995	848	-4.306	0.409	41.053	684	40.866
0026	1349	17.492	848	-5.610	0.521	54.799	683	54.690
0027	1349	22.220	844	-7.004	0.598	68.663	684	68.665
0028	1349	26.187	861	-8.016	0.616	81.717	684	81.951
0029	1349	30.244	865	-9.161	0.618	95.552	684	95.912
0030	1349	35.920	831	-10.034	0.605	109.507	684	110.002
0031	1348	39.066	834	-10.455	0.584	122.628	684	123.013
0032	1348	44.477	839	-11.054	0.521	136.467	684	136.956
0033	1349	48.887	843	-11.359	0.425	150.764	684	151.105
0034	1349	51.671	846	-11.427	0.349	163.816	684	164.075
0035	1348	51.012	841	-11.354	0.566	177.583	684	177.917
0036	1349	53.562	840	-11.197	0.629	191.969	684	192.258
0037	1348	55.214	839	-11.320	0.607	205.029	684	205.181
0038	1348	55.477	839	-11.208	0.635	218.926	684	219.031
0039	1348	58.581	842	-11.499	0.521	233.096	684	233.180
0040	1349	58.237	838	-11.257	0.666	247.249	684	247.169
0041	1348	57.818	838	-11.246	0.641	260.428	684	260.159
0042	1348	57.804	836	-11.076	0.695	270.400	684	270.062

RIGHT-TO-LEFT (INITIAL CLOCKWISE STEER)

0043	1350	-13.184	846	4.096	-0.397	41.354	684	41.343
0044	1349	-18.184	852	5.374	-0.505	55.272	684	55.208
0045	1349	-23.025	864	6.606	-0.580	69.098	684	69.180
0046	1350	-25.898	848	7.738	-0.608	82.043	685	82.236
0047	1349	-32.389	833	8.737	-0.609	95.972	684	96.213
0048	1349	-37.653	837	9.507	-0.547	109.862	684	110.074
0049	1349	-42.257	840	10.171	-0.487	123.008	684	123.226
0050	1348	-45.550	842	10.495	-0.469	136.999	684	137.111
0051	1348	-49.284	849	10.906	-0.254	151.217	684	151.096
0052	1348	-52.379	846	10.893	-0.494	164.233	683	164.126
0053	1348	-55.111	848	11.220	-0.399	178.155	684	177.911
0054	1348	-57.087	849	11.280	-0.409	192.449	684	192.152
0055	1348	-58.754	846	11.345	-0.473	205.433	683	204.986
0056	1348	-61.210	849	11.491	-0.320	219.356	683	218.894
0057	1349	-61.781	851	11.539	-0.213	233.538	684	232.914
0058	1349	-63.431	849	11.478	-0.333	247.458	684	246.995
0059	1348	-62.476	844	11.151	-0.518	260.499	683	259.907
0060	1348	-62.250	846	11.157	-0.439	270.462	684	269.783

7.5 SLOWLY INCREASING STEER TEST RESULTS

2014 Mazda3

NHTSA No.: C20145406

Date Created

27-Aug-14

File	Vehicle	EventPt	DOS	MES [mph]	Mean SPD [mph]	AYcount_3	THETAENCF_3 [degree]	AYCG_CD2_3 [g]	r_squared	ZeroBegin	ZeroEnd
0013	2014 Mazda3	703	1	50.325	50.101	1103	-26.992	-0.295	0.998	503	703
0014	2014 Mazda3	704	1	49.441	49.485	1110	-27.472	-0.303	0.999	504	704
0015	2014 Mazda3	704	1	49.838	49.574	1105	-27.071	-0.305	0.998	504	704
0016	2014 Mazda3	695	0	50.226	50.499	1108	27.510	0.301	0.995	495	695
0017	2014 Mazda3	696	0	49.714	50.031	1112	27.802	0.299	0.999	496	696
0018	2014 Mazda3	703	0	50.128	50.313	1106	27.406	0.299	0.999	503	703
Averages								27.4	0.300		

Scalars Steering Angles (deg)

1.5	41
2	55
2.5	69
3	82
3.5	96
4	110
4.5	123
5	137
5.5	151
6	164
6.5	178
7	192
7.5	205
8	219
8.5	233
9	247
9.5	260
9.9	270

7.6 INERTIA SENSOR MEASUREMENTS

2014 Mazda3

NHTSA No.: C20145406

Device : U12-05-08-07108

device version : 2.25

device certification date : 08/29/13

today is : 8/27/2014

units : Millimeters

Label	ActualX	ActualY	ActualZ
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C_DEVICEPOS001

M_PLANE001 1,056.730 -653.313 -308.473

M_LINE001 568.936 -7.314 -66.007

M_FRT_AXLE_CENTER_ORIGIN 0.000 0.000 0.000

C_COORDSYS001 0.000 0.000 0.000

M_TIRE_TREAD_CENTER 244.614 85.379 -222.247

M_INERTIA_PACK 1,600.034 868.841 540.310

M_ROOF 1,831.535 838.176 1,132.982

M_GROUND 1,831.858 -141.068 -308.687

Track Width 1,557.337

Roof Height (relative to ground) 1,441.669

Motion Pak - x-distance (mm) 1,600.034

Motion Pak - y-distance (mm) 4.794

Motion Pak - z-distance (mm) 804.547

Motion Pak - x-distance (inches) 62.993

Motion Pak - y-distance (inches) 0.189

Motion Pak - z-distance (inches) 31.675

x-distance (longitudinal) Point of reference is the front axle centerline.
(Positive from front axle toward rear of vehicle.)

y-distance (lateral) Point of reference is the vehicle centerline.
(Positive from the center toward the right.)

z-distance (vertical) Point of reference is the ground plane.
(Positive from the ground up.)